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B. A. SINNEN, CIRCULATION MANAGER

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CALENDAR REFORM

By Frederick Homburg
Woodward High School, Cincinnati

WHAT is a calendar? We speak of a university calendar, a teachers' calendar, meaning thereby a program or plan of procedure during a coming period of time. Ordinarily a calendar is understood to be an orderly arrangement of the units of time; or, to be more specific our calendar is the arrangement of the days of the year according to months and weeks. Our calendar is of Roman origin. The very word calendar comes from the Latin name for the first day of each month; and the names of our months are Latin.

When Julius Caesar became the uncrowned ruler of Rome, he instituted a number of necessary and beneficent reforms, one of which continues to attract our attention daily, and that is the calendar reform. Of course we now use the Gregorian calendar, but what is that but the calendar of Julius amended? To put an end to the confusion under the old Roman calendar, Caesar fixed the length of the year at 365¼ days, and decreed that every 4th year should have 366 days.

Since the exact length of the solar year is 365 days, 5 hours, 48 minutes, 46 seconds, or not quite 365¼ days, this method of intercalation pushed the 1st of January farther and farther into the next year. The error amounts to one day in 128 years or 3 days in about 400 years.

When in 1582 under Pope Gregory XIII, the correction was made, the error had grown to ten days. It was decreed that in that year ten days be suppressed by calling October 5th the 15th day of October, that the Julian intercalation be continued, provided, however, that the century years (except those that are multiples of 400), be common years. Now this will correct the calendar for many centuries but the slight error that exists will grow and equal a day in nearly 4000 years; so as a further improvement, the century years divisible by 4000 are to be common years. Thus time is arranged for thousands of years ahead, and we might leave further calendar troubles to future races if any should still exist when this arrangement runs out.

How much better this is than the Julian calendar is plain, when you consider that in Greek Catholic countries, where the

Julian calendar was continued, the dates and the seasons do not exactly correspond, though this is not so pronounced as in the pre-Julian days. How simple the Gregorian calendar is can be shown by comparing it with the very intricate calendars of the Jews and of the Mohammedans. And yet many are dissatisfied with the Gregorian calendar.

Reforms of the Calendar Proposed by the French Revolutionists

The dissatisfaction took concrete and vehement form during the early days of the French Revolution. This is not to be wondered at when one considers that a frenzy for change and the determination to consign to oblivion the old regime had seized the French. No better means could be found for breaking with the memories of the past, than a change of calendar; and where everything was to be new and improved, there was the chance of correcting flaws which had not escaped their notice.

The calendar reported by the commission was revolutionary indeed. Sept. 22, 1792, the day on which the republic had been proclaimed was the beginning of the new era, the first day of the year I. There were twelve months of 30 days each; this would give 360 days; the remaining 5 days of common years and 6 days of leap years were added to the last month. The months were divided into 4 groups; the fall, winter, spring and summer quarters; and the months were renamed to correspond to the season. Each month was divided into three parts of ten days each; each part was called a "decade" and the days were numbered: *Primidi, Duodi,* etc.

However, it was found to be a great inconvenience to have a calendar different from all the rest of the world, so, on Jan. 1, 1806, France returned to the use of the Gregorian calendar. Some time before this, they had discarded the 10 day period and returned to the 7 day week. In 1871, during the short rule of the Communards, an attempt was made to revive the revolutionary calendar; and since then a number of suggestions for calendar betterment have emanated from France.

Had the earth been so accommodating as to revolve about the sun once in exactly 364 days, a year of 13 months each with 4 seven-day weeks would fit admirably; or if for the sake of quarters, the 12 month arrangement were to be preferred, we might have 4 quarters each with 3 months (2 with 30 days, 1 with 31 days); there would be advantages and disadvantages in each scheme. However, all this is but an idle dream of what might

have been, for the solar year is made up of a number of days which is mixed, and the whole part is exactly divisible only by 5. Two points especially complained of in our calendar are: 1st, the inequality of the months, and 2nd, the disagreement of the days of the year and the days of the week. Another inconvenience (not inherent in the calendar, however) is the movable church holidays, i. e., Easter and the church festivals dependent on it.

Further Desirable Reforms

So we may speak of the desirable reforms: the reform of the month, the reform of the week and Easter reform. It is by no means necessary that all the reforms be adopted at the same time, although that might be the more rational way.

France with its revolutionary calendar has blazed the way. We might reasonably expect something of calendar reform to emanate from our country because we are usually less conservative than people in the Old World, and less hampered by tradition. Indeed, in the last half of 1910 and the first half of 1911, a number of projects for the improvement of the calendar appeared in *Science*. A number of minds ran in similar channels, so some of the schemes differed only in minor details; hence it will suffice to outline three representative schemes.

Suggested Changes

One contributor considered the shortness of February the chief objection to our calendar, and suggested the following: 5 months (January, June, July, August and December) with 31 days each, or 155 days; the remaining seven months to have 30 days each or 210 days; February to have 31 days in leap years.

T. C. Chamberlin proposed the following divisions of the year: (a) 4 quarters corresponding measurably to the seasons; (b) 12 months (of 28 days or 4 weeks) in groups of 3, terminated by a single closing week, all months to begin on a Monday; (c) 52 weeks of 7 days each, all beginning with Monday, 48 weeks in groups of 4; the 13th week called Easter week for Easter holidays, the 26th or Julian week for commencements, the 39th or Gregorian week for harvest home, fairs, etc., the 52nd or Christmas week for Christmas celebration; (d) the odd 365th day to be *dies non* as far as month and week are concerned placed at the end of the year as New Year day; likewise the 366th or Leap Day.

Cyril G. Hopkins suggested assigning to March, June, September and December 5 weeks of 7 days each and giving to each

of the remaining months 4 weeks of 7 days each. Every 5th year a leap week is to be added to December, to be omitted each 40th year save the tenth and each 20,000th year save the 10th, starting with the Christian era. Thus there would be no leap week in 1960, 2040, 2080, etc., but there would be one in 2000, 2400, 2800, etc., and again there would be no leap week in 20,000, 40,000, 60,000, etc., but there would be one in 200,000, 400,000, 600,000,etc. He further suggests, (what sounds strangely millenial in these days of trouble), that this reformed calendar be called Peace Calendar (marked P. C., to distinguish dates from O. S. and N. S.), and that its inauguration mark the beginning of permanent peace among civilized nations.

You will note that this calendar corrects better than the Gregorian; but it is not clear why the Leap Week should be added to a long month like December, except that this is the end of the year; custom would suggest adding one week to February, for it certainly would seem less peculiar to write Feb. 35th than Dec. 42.

Prof. Chamberlin says: "The several suggestions awaken the hope that a calendar can be contrived which will be much superior to the present one, and which at the same time will not encounter so much prejudice and human inertia as to be fatal to its adoption at an early date. It is, however, of the first importance, that the new calendar be so well matured before its adoption is seriously urged, that it will not itself need to be laid aside for something better by the time it has fairly come into use." Here we have the Scylla and Charybis of calendar reform, and the suggestions just given are good illustrations: the first does not go far enough, the other two probably go too far. If the improvement is slight, it might fairly be asked, Why make a change? If the proposed change is radical, the opposition to it will be hard to overcome. Few of the more strenuous reformers seem to realize how great is the mass of conservatism arrayed against them. Why not ask whether or not the advantages gained would be at all comparable to the trouble and inconvenience caused? Bear in mind the slowness with which the Gregorian calendar was adopted, and the fact that it is still resisted in Greek Catholic countries. Some who assert that a simplified calendar is not wanted should be reminded of the comfortable feeling of the public in the March of common years because the days of the month fall on the same week days as in February.

Some are opposed to the idea of a day outside of the week and month, although the reformers are usually agreed that it should be observed as a legal holiday. For some time through-

out the Roman Empire the odd day in leap years was treated as a literal (not merely legal) *dies non*, being regarded as part of the day preceding, i. e., they made one day 48 hours in length. What was done once in four years in imperial Rome is done daily by travelers crossing the international date line from West to East: they count the same date twice. The U. S. Senate has a very simple way for prolonging a day: when in protracted session, the coming of the next day is put off by turning the hands of the senate clock back.

If we dropped our fondness for Pagan week day names and simply numbered the days of the week as the ancient Hebrews, the Quakers and the French Revolutionists did, and as some Slavic people still do, and as many do with months (business letters call the 15th of March 3/15), we might have one week in 52 with an 8th day.

Again and again calendar reformers must be reminded that a small change even if free from objections may not have behind it the driving force necessary to secure its adoption, while in case of a great change, religious scruples, tradition and custom block the way.

Calendar Changes Proposed in England

In 1911 a reform project which had been agitated on the continent of Europe for fully a quarter of a century and which avoided both extremes came up for discussion in England. In that year Mr. Robert Pearce presented to Parliament a calendar reform bill. According to this the first day of the year, New Year's Day, was outside of the week and month; similarly Leap Day was placed between June and July. The 364 days left were divided into 4 quarters of 91 days, each quarter was sub-divided into 3 months of respectively 30, 30, 31 days. The 1st of January, always on Monday, gives 26 week days each month and 5 Sundays in the longer months. Every calendar date corresponds to a particular day of the week and the calendar is fixed. Here is this perpetual calendar:

	January April July October					February May August November					March June September December				
	Non week day before Jan. & July														
Monday	1	8	15	22	29		6	13	20	27		4	11	18	25
Tuesday	2	9	16	23	30		7	14	21	28		5	12	19	26
Wednesday	3	10	17	24		1	8	15	22	29		6	13	20	27
Thursday	4	11	18	25		2	9	16	23	30		7	14	21	28
Friday	5	12	19	26		3	10	17	24		1	8	15	22	29
Saturday	6	13	20	27		4	11	18	25		2	9	16	23	30
Sunday	7	14	21	28		5	12	19	26		3	10	17	24	31

The same year a second bill was presented, this time by Sir Henry Dalziel. This differed from the Pearce bill in another division of the quarters. Each quarter consisted of 3 months with the first and second of 28 days and the third of 35 days; thus each month contained an exact number of weeks and began with a Sunday. The scheme given below shows that this gives a symmetrical and simple calendar; but the inequality of the months would certainly not be endorsed by the business world.

Non week day before Jan. & July

	January April July October				February May August November				March June September December				
Sunday	1	8	15	22	1	8	15	22	1	8	15	22	29
Monday	2	9	16	23	2	9	16	23	2	9	16	23	30
Tuesday	3	10	17	24	3	10	17	24	3	10	17	24	31
Wednesday	4	11	18	25	4	11	18	25	4	11	18	25	32
Thursday	5	12	19	26	5	12	19	26	5	12	19	26	33
Friday	6	13	20	27	6	13	20	27	6	13	20	27	34
Saturday	7	14	21	28	7	14	21	28	7	14	21	28	35

Both of these schemes are based on the Gregorian calendar, so in their adoption no scientific point would be involved, and the convenience and feeling of the public alone would be concerned. An improvement of the Dalziel project would be to break with the Gregorian method, discard the *dies non,* and base it on Prof. Hopkins's scheme.

Is Calendar Reform Desired?

But who wants the reform? Easter reform is favored by many but that could be had without making any other change. Up to the present, the question of reform is almost wholly academic; and the small circle of scientists bent on reform is not at all agreed as to the kind of change. In some parts of the world a calendar union is more necessary than a calendar improvement. A merchant in Cairo, Egypt, may have dealings with users of the Coptic, the Jewish, the Mohammedan, the Julian, and the Gregorian calendars; and such a person must find this condition of things unfortunate. In the United States we usually hear of no calendars but the Gregorian and the Jewish; the Jews, however, use their calendar only for determining their religious holidays, and that is strictly their own concern; for worldly or business matters, they use the calendar reformed by a Pope. This is both sensible and tolerant and conveys a hint that we might have a simplified calendar the world over for general use, and let churches for their holidays use what calendars they please. The calendar is a question of science, not of religion; for the day is long past when a priesthood was the repository of all learning

and science. Meanwhile the public at large is apathetic to a change; most people are satisfied with looking at wall and desk calendars furnished free by stationers, publishers, insurance and railway companies and other business concerns whose managers consider this a good means of advertising. Then why talk of calendar improvement at present? Because those favoring it hope that in the reconstruction which must follow this terrible war, one reform more or less would make little difference, and that therefore calendar reform has just now a better chance of success than in times of prolonged peace.

TEACHING COMMERCIAL GEOGRAPHY

By Charles A. Daly
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THERE have appeared in the Journal of Geography from time to time, excellent articles pertaining to Commercial Geography. In the following I intend to bring together the various phases of the subject. It is needless to state that no aspect of the work will be dealt with in an exhaustive manner, but I hope that parts of it may be suggestive to some of my fellow teachers. Then again it may be claimed that geography in most high schools is not given enough time to warrant the expenditure of labor and money necessary to carry on a course of this kind. My only reply to this is that it seems to me it should be, and I am hoping this article may have a little influence toward making the customary six months geography course, for a few students, a year or two year course for all, with a recognized place for the subject among high school departments.

I shall consider the discussion under two headings: (a) Equipment; (b) Teacher. The first will be divided into eight parts: 1. Textbook. 2. Laboratory. 3. Laboratory manual. 4. Maps, globes, and models. 5. Moving pictures, lantern slides, and opaque projection work. 6. Museum. 7. Library. 8. Visiting or field work.

The Text Book

The text book is placed first. However, you will notice that it is but one of the eight topics of part (a), and it seems to me that its importance bears just about that relationship to the subject as a whole. It is a great pity that in many schools it is made the entire subject. We are living in a bookish age; our ideas and conclusions are too often little more than the ideas and conclusions of the authors of the books we read. The text book how-

ever, as an aid, a presentation of the whole subject by one who has systematized it carefully, a point of view, and a convenient reference, has its advantages if properly used. It is a digest, and must be supplemented continually by the agencies treated below, that its words may have meaning and that the students may obtain well-rounded concepts. No other subject yields more readily to concrete study than geography, and when we go at it in a concrete way we shall have the interest and enthusiasm of our pupils, and they will receive in return knowledge which is both cultural and practical.

The Laboratory

This is so uncommon an institution in high schools that it almost savors of an original suggestion. We have our chemistry, physics, and biology laboratories; they are innovations of a fairly recent date and have proven their worth, but geography, the mother science, the true and logical general science, must go without. "West Tech." in Cleveland has its laboratory; so has Lincoln High in Tacoma, and a few other high schools. The atmosphere of a laboratory cannot help but add to the interest of the work. Put into it globes, relief maps, and wall maps, a selection of the U. S. Geological Survey's topographic maps, government reports, and your own state publications, time tables, railroad maps, and descriptive folders, manufacturers' pamphlets, pictures and slides for projection work, reference books, especially a liberal number on travel and industries, clippings from daily papers and magazines,—put all this material in racks and cabinets so as to be accessible, and you will have made a start toward genuine geography work. It is surprising how much of the above list, and many other things, can be obtained by the expenditure of a little time and a two-cent stamp.

The Laboratory Manual

"Writing maketh an exact man," especially when you add the all 'round work of a good geography manual and precede that work by investigation and study, and follow it with a quiz. It trains the pupil in observation and logical thinking. To be able to put things down in black and white he must have definite ideas.

We now have many manuals pertaining to Commercial and Industrial Geography: Tarr and von Engeln's *Physical and Commercial Geography;* Dryer's *Manual for Economic and Regional Geography;* Bogart's *Industrial History Manual;* Martin's *General Geography;* Jefferson's *World's Commercial Products;* Sanford's *Commercial Geography,* and others. Some of the above

may be suited to your work or may not be, but all of them will furnish valuable suggestions. It is possible that the commercial geography manual best suited to any school would be that made for the school or district. We all have a definite physical environment, certain local industries, a limited collection of museum exhibits, maps, and other material; why not take these as a starting point, utilize them to the best advantage, and work out from them into the complicated commercial world? Will not our students have a more clear and more definite idea of things and be more interested, than if the various problems and exercises are based upon material and industries with which it is impossible to have direct contact? In this way the manual will serve as a guide leading to the fullest use of your laboratory equipment. It will encourage healthful investigation on the part of the pupils into the relationships of the common foods, articles of clothing, and raw materials used in the home factories; into the great problems of transportation, natural resources, conservation, agriculture, etc.

Maps, Globes, and Models in Relief

Maps are as necessary to the teacher of geography as the transit is to the surveyor, or the compass to the navigator. They make for definiteness, clearness, and accuracy. Now that we have such a varied assortment of splendid maps, every geography class should be well supplied. It seems to me that the high school minimum in wall maps should be a map of the world, one of the United States, and one of each continent. The physical map being preferred to the political, when both cannot be obtained. The above is surely a small equipment, yet how many classes are there about the country that have not even this! It is a regrettable fact and a striking proof that we still have big work ahead of us—the education of teachers, principals, school-boards, and the public, up to a realization of what efficient geography work demands.

In addition to the above, the blackboard maps enable the teacher or pupil to illustrate the lesson as it progresses. The large paper outline wall maps make it possible to construct rainfall, temperature, production maps, and others, which can be kept from year to year. Then there are those issued by the various railroad and steamship companies. The small desk outline maps, of various sizes, sold by a great number of publishers, are of great value. They make it possible for each student to work out his own map-problems, and a well arranged laboratory manual would include a large number of them.

Globes, representing as they do, and as a map cannot, the countries in their true proportion with correct directions, will be found indispensable, even with high school students, for the giving of correct and adequate notions of the earth. Finally, a certain number of models of countries in relief, ought, if at all possible, to be in every geography laboratory. The cost of these is usually high, but a few regions can be selected which will illustrate a great variety of geographic features. The students themselves may be encouraged to make a model of a certain region, and a few may be skilled and become interested enough to turn out a first-class product. If these are made from a topographic map the advantages are increased many fold. In fact. it might be very profitable to demand from each student once during the term a small but carefully worked-out model of some region of great commercial or industrial importance, marking upon it the chief geographic and cultural features.

Moving Pictures, Lantern Slides and Opaque Projection Work

It is hard, as those of us who have tried know, to give our students a first hand acquaintance with many of the things pertaining to commercial and industrial geography, in our own city, town, or immediate region. It is impossible to take them into distant states or countries. I will discuss the first, namely, visiting and school excursions, in a later paragraph. As regards the second, getting acquainted with distant lands, we are not face to face with an insoluble problem. We can bring them into the school room in the form of the moving picture, the lantern slide, the stereograph, or the plain picture itself, with the use of the opaque projection lantern. If there were no pictures how we should long for some means of conveying scenes to our pupils, yet how small a use we make of them, abundantly supplied as we are, and knowing, as we do, that the average person is eye-minded!

The moving picture is the most realistic of all. Any school with a moving picture machine can become enrolled in the circuit of the Bureau of Commercial Economics, at Washington, to receive their industrial films from week to week. The only cost is the expressage from the last user to yourself. The Toledo Museum of Art also distributes films. A large number of reels may be obtained from manufacturers directly. For example: The American Cyanamid Co., of Buffalo, has a picture showing the use of Niagara Falls power and the fixation of atmospheric nitrogen. The Postum Cereal Co., of Battle Creek, Mich., shows the workings of its great factory in preparing food products. The

Peabody Coal Co., of Chicago, shows modern methods in the mining of coal. The Holt Manufacturing Co. shows the working of their caterpillar tractors and harvesters on the western plains. The Industrial Moving Picture Co., Boyce Building, Chicago, will give you a list of firms they have made films for. Also the large film corporations, like the Universal, Mutual, and General, have a large number of travel and educational films which can be hired at a small cost.

The Pathescope Company has a machine which uses a film smaller than the standard size. They maintain offices in a large number of cities, and any school can receive their service, consisting of a number of films a week, at a small cost. The advantages of their service are that the machine is simple, easily run, and the films are not dangerously explosive like the nitro-cellulose films. The Literary Digest of February 24th, describes a new invention, a moving picture machine that will reflect pictures from a paper reel. This, if successful, should present great opportunities to geography work.

Lantern slides are perhaps the most used of any of the means of visual instruction. They can be bought from any number of firms. The best known are advertised in the Journal of Geography and other geographical periodicals from time to time. Many of these firms issue booklets containing valuable suggestions in the use of slides. The United States Forest Service has beautifully colored slides to loan. Several railroads also loan slides showing scenes along their roads. For example: The views along the Hudson, in the Catskills, the Mohawk Valley, and of Niagara Falls, by the New York Central Railroad; and views of Yellowstone Park and the Rocky Mountains by the Northern Pacific. The making of a certain number of your own slides is not difficult and the personal touch which they give will increase the pupils' interest.

The stereoscope is preferred by some to the use of screen projection. It has the advantage of holding the pupils attention fixed on a picture in his own hand, and of giving him a lighted room in which to work out his notes as the lesson progresses. Perhaps there is a place for both lantern slide and stereoscope.

All of the above present great opportunities for visual work; but, for the ordinary high school, I believe the opaque projection opens up the largest field. Opaque projection machines are now made with all the advantages of the lantern slide machines, showing non-reversed images, presenting clear pictures, and being capable of rapid change. In addition you have an almost unlimited number of pictures from magazines, advertising

pamphlets, and other illustrative matter to select from. Because of this wide field the pictures may represent the selection best suited to your course, new ones may be continually added or substituted for old ones, and the cost is very small, in most cases nothing. An additional advantage of the reflectoscope is the encouragement you can give to individual effort, by showing pictures or news clippings brought in by the pupils, or the work of the students along any line whatever.

Visual work can be either very superficial or very thorough, as one chooses. The arousing of interest may be the primary aim, and the getting of facts secondary. In that case the mere showing of pictures will tend to arouse interest, and once you have done this, teaching is easy. On the other hand, if while studying the topic of plantation rubber, you lead up to the subject with an informal class discussion, assign topics to be worked up by individual pupils, have reports made the following day with picture illustrations, allow free discussion of the pictures and of the various statements made, and finally demand a written report from each student, you surely have adopted a method which cannot help but be thorough and must leave a good many permanent impressions with the children.

In conclusion, on visual instruction, let me emphasize this fact: in taking up this line of work you are entering no easy field. The care of the additional equipment, the preparation of lessons, and the study of what to stress and how to do it, all demand a great deal of thought and attention, if satisfactory results are to be obtained.

The Museum

As a complement to the picture work we have the museum collections. The picture brings a representation of the outside world into the class room. The museum collections actually bring parts of the outside world itself. They excite the interest, stir the imagination, and put exact definite impressions in place of vague word-pictures. A good start toward a complete collection can be made with the Philadelphia Commercial Museum's collection, which is distributed gratis to the schools of Pennsylvania, and can be purchased, at times, by schools outside of the state. Their catalogues, descriptive of the collection, furnish a suggestive guide to one who is building up a school museum. The thirty-nine exhibits in the Industrial Collections of the Scientific Supply Co., of St. Louis, cover the industrial field fairly well. There are also for sale smaller collections such as the mineral collections sold by various geographic and scientific supply bureaus.

Once your material is collected, it can be made valuable by being systematically arranged and kept available for instant use, or valueless by being stored away in some inaccessible corner. Hall cabinets of adequate size are a good means of displaying the exhibits to the school as a whole, and making them serviceable to a certain extent to all.

The Geography Library

Having a number of interesting books in the school, dealing with the subjects which are being taken up, will add greatly to the interest of the classes, and will be of great value to the students. The number of books which a school library can possess, however, must be limited, therefore I am very favorably inclined toward the system in existence in some cities, where a branch of the main public library is maintained in the high schools. This would be of great advantage in geography work. A few days before a topic is to be taken up, say Brazil, the teacher notifies the city library. There is then placed in the school as many books as possible about Brazil. The pupils are referred to these and are encouraged to take home and read those which appeal to them; individual assignments of great variety may be made. These books are later returned to the city library and a new set obtained when passing to the next subject.

Of course, your school library will have its own atlases, dictionaries, encyclopaedias and geographies. Valuable pamphlets can be obtained from railroads, steamship lines, city boards of trade, manufacturers, and the various government and state departments. A few current magazines as The National Geographic, The Journal of Geography, The Literary Digest, and The World's Work, should also be in the library.

Visiting

"Geography is a study of the earth as the home of man." Commercial and Industrial Geography is a study of the earth as the work-shop of man. Every school, no matter where situated, is among people and institutions engaged in carrying on the business of life. Our immediate environment is full of illustrations of our connection with, and dependency on, the outside world.

Take Detroit as an example. We have a botanical garden with growing plants from all zones; the cactus, coffee, orange, banana, rubber, and even the papyrus, growing within our city limits. With a little co-operation between the botanical people, school, merchant, and manufacturer, this garden could contain a wonderfully educational display of plants which are of use to mankind. The aquarium has the sturgeon, salmon, whitefish,

trout, cod, and many other varieties of fish. A class would probably get more lasting facts about our fisheries and their conservation through a visit to the aquarium, its hatcheries, and exhibits, than they could in days of class room work. The museum is handy with its varied collections and is already offering to work with the schools. Then there is the country about us with its clay, sand, limestone, and salt, all entering into the commerce and industry of our city. We have the varied governmental activities, the aids to commerce, such as the weather bureau, light houses, water way improvements, and customs service; there are also the docks and freight yards. If we could only get into closer touch with them we could learn much of our world geography there. Finally, there are the factories, the great melting pots which take in the iron from Lake Superior, the rubber and gums from the tropics, herbs and roots from the five continents, with other necessary materials, and send them to many distant places in the form of automobiles, stoves, paints, varnishes, and medicines.

It seems to me that one of our biggest problems is to study out how to adjust our school schedule so as to be able to use our opportunities adequately, and thereby make our work the live, practical, and up-to-the-minute subject that it may be.

The Teacher

We now arrive at the last topic: the teacher is by far the most important factor. With a well-trained, healthy, broad minded, earnest, enthusiastic, and adequately paid teacher, wonders can be accomplished, in spite of a lack of co-operation from those who should co-operate. The better general knowledge the teacher has, especially of geology, meteorology, chemistry, physics, botany, zoology, economics, sociology, history and civics, the better prepared will he be to handle this subject.

In conclusion, to emphasize the pressing need for equipment, let me repeat the quotation that Miss Knight put into her recent article in The Journal of Geography: "Just as modern business has found it necessary to install a one-hundred-dollar typewriter, to take the place of the penny quill pens, so must education, to be effective, develop and employ the elaborate tools needed by new and complex modern conditions."

Commercial Geography is a rather new subject, it is a big subject, and fills a want in commercial and mechanical courses. It must ultimately get greater recognition and equipment. In training the technical students, who are forming a larger and larger proportion of our high school population, we must put them in touch with the fundamentals of the big problems of business, as well as give them the mere mechanics of their trade.

CRUDE SUGAR MAKING IN CHINA

SOIL and climate combine to make southern China a sugar growing region. And as with nearly everything else in China, every industry is a local one, and raw products are used on the spot. Hence one is not surprised in passing along a country road to find in the midst of a number of cane fields a small sugar mill. The manufacture of sugar, in every step of the process, exhibits the Chinese use of the resources at hand.

In the midst of a number of fields where the sugar cane is growing on the artificially terraced hillside or the more level flood-plain of some stream, stands a small house with mud walls and tile roof. The walls of this house, as in the case with the walls of many houses in southern China, have been made with the clay and mud dug from the hillside, and pounded hard between two boards set up on either side of the future wall, and raised as the wall grows in height. In front of the house stands the mill, which consists of two cylindrical stones revolving on vertical axes, and turned by a long beam of some 10 feet sweep. These stones have probably been quarried from a nearby hill, and cut and polished, forming vertical rollers about three feet in diameter and a little more than that in height; at the top are cogs so that one roller will turn the other. To the beam is hitched a cow or water-buffalo, driven around in a circle, furnishing the motive power for the mill. In most parts of this portion of China cows are kept as beasts of labor, to plow the fields, grind sugar-cane, etc.; valuable as they might be for the beef and milk which they could furnish, they are never used for these products, except in a few favored localities where Western influences have been sufficiently felt. And the American who lives in these rural regions where milk and beef are not to be had, sadly wearies of Carnation Cream and chicken or tinned meat, while seeing cows at work every time he ventures on the road.

The sugar-cane is fed into the mill, and the two stone rollers crush out the juice which is caught in a wooden tub set into the ground. The juice is thence removed to a kettle placed over a fire in the house nearby, and while the dried cane furnishes the fuel, the juice is boiled down to a thick syrup. This syrup is then poured into large trays of bamboo, locally abundant, and the most used material for all kinds of manufactures in this part of China; and here the sugar is formed as the syrup cools and hardens. It is a coarse brown sugar, not appetizing in appearance, and with a taste disliked by some, but with the quality for

which sugar is pre-eminently desired, sweetness. And thus it is marketed.

The sugar-cane from which the juice has been pressed has not thereby lost its value, however. Some of it furnishes the fuel for boiling the syrup; some of it furnishes food for the patient cow who does all the hard work of the mill; and some of it, spread over the fields, helps to fertilize those fields for next year's crop.

The cane ripens in mid-winter and during January and February one of these mills may produce from sixty to one hundred pounds of sugar a day, as a maximum output.

WALTER N. LACY,
Foochow, China.

INFLUENCE OF THE GULF STREAM

Editor, Journal of Geography.
Dear Sir:

I enclose copy of a letter from the head of the U. S. Coast and Geodetic Survey, touching the influence of the Gulf Stream on the land climate. Coming from one of such high official position, it might have great weight in correcting the views about those currents which used to prevail so widely, but are being modified considerably of late. I think it would be well for advancing the cause of accuracy in geographical teaching if you could call attention to this utterance in your magazine.

Yours very truly,
C. MERIWETHER,
Business High School, Washington, D. C.

My dear sir:

In reply to your letter dated March 1, 1917, I take pleasure in submitting the following statement concerning the effect of the Gulf Stream upon the climate of the British Isles.

Recent opinion on this subject generally accepts the prevailing wind, in its relation to the position or distribution of land and water areas, as the principal climate-modifying agency.

The oceans regulate the climate where their influence is communicated to the land through the air as a vehicle; conferring upon the lands so affected an insular climate, or one free from extremes of heat or cold. The moist winds blowing from the ocean over the land, by means of clouds which they tend to form, protect the land from excessive heat due to the direct rays of the sun and also prevent the rapid loss of heat through radiation. The warmth of the ocean is transferred to

the land in the sensible heat of the air and by the very considerable latent heat released upon the condensation of its vapor in the form of cloud, fog, and rain.

Similar climatic influences are found on the leeward shores of the Great Lakes, Mediterranean Sea, The Baltic, and other large bodies of water.

The prevailing southwest winds of the north Atlantic reach the west coast of Europe after passing over a wide expanse of ocean surface and arrive at the British Isles laden with the heat and moisture which in the manner indicated above give to that region its mild, or insular climate.

Ocean Currents do carry the warmth of the Torrid Zone into high latitudes; but of the general circulation of the waters of the north Atlantic, by which this transfer of heat is accomplished, the Gulf Stream constitutes only a part.

(Signed) E. Lester Jones,
Supt. Dept. of Commerce,
U. S. Coast and Geodetic Survey.

GEOGRAPHIES OF THE EIGHTEENTH CENTURY

TEACHERS who are given to finding fault with present day texts would find much consolation in reading a geography of one hundred and twenty-five years ago. The following conveys some idea of the books in use at that time: *The American Universal Geography* by Jedidiah Morse is typical. The introduction consists of seventy-two pages of fine print and discusses such problems of spherical geometry and astronomy as: The latitude of the place, and day of the month being given; to find the time when any known star will rise. To represent the face of the starry firmament, as seen from any given place of the earth, at any hour of the night.

Throughout the book, speculation, civics, history, geography, astronomy, zoology, botany, and moral philosophy are intermingled. A speculation on the origin of the American aborigines, carries us back to the confusion of tongues at Babel. The author believes that the women of Pennsylvania are as pretty as the women of any other state. Ten pages are devoted to the discovery of America, and the Constitution of the United States is given in full. The plants and animals of each state are described in detail as they should be in a botany or zoology. The size, color, habitat, scientific name, use, medicinal properties and other minutiae of each plant and animal are given. The author, even at this early date, predicts the freedom of the slaves

and the construction of the Panama Canal. In order that nothing may be omitted, we are given a full list of the diseases prevalent in each state and the number of deaths from each per year.

The following is a typical extract: "The respect paid by children to their parents, and by the young to the old, among these people, is highly commendable. Parents are fond of their children (strange and illuminating)! The affection of husbands for their wives is less than the wives for their husbands; and it is very common for men to love their neighbors' wives better than their own." "My son, who art come into the light like a chicken from the egg, and like it art preparing to fly through the world, we know not how long heaven will grant to us the enjoyment of that precious gem which we possess in thee; but however short the period, endeavor to live exactly, praying God continually to assist thee."

The complete schedule of the Princeton students is given. At another college, so we are informed, the students must sleep on straw beds. The history, customs, origin, number of churches, number of ministers and number of communicants of all the denominations are given.

Take heart, teacher; the geographies of the eighteenth century were wonderful to behold and to read.

ALBERT EARLEY,
N. Plainfield, N. J.

SUGGESTIONS FOR DISPLAYING POST CARD VIEWS

THE article by Sayrs A. Garlick in the November, 1916, issue of the Journal of Geography has encouraged me to send you a description of the manner in which I display post-card views. I have sets of my own, as well as sets which are sent out from the Educational Museum of the Cleveland Normal School, illustrating the different industries of the United States; the regions of the earth; Arctic, desert, jungle, etc.; tea-picking in Asia, and foreign life in general. They are too small to stand in the chalk tray without disarrangement, or liability of soil from handling, not to mention loss.

I have taken a discarded picture frame, 23 x 30 inches, removed the board on the back, and to this fastened a piece of green denim (any plain color will do). The post-cards are held in place on this by thumb tacks on either side, not allowing them to pierce the card. It will hold twenty cards. The board is replaced behind the glass and held securely by small pieces of wood, screwed to the sides, which act like old-fashioned door

buttons. The frame is hung from a picture hook on the molding above the blackboard, where even the smallest can easily see it.

AUGUSTA K. JOY,
Cleveland, Ohio.

CEYLON

THE island of Ceylon lies a few degrees north of the Equator and just off the southeast coast of India where its mountains cause sufficient precipitation for continuous agricultural pursuits,by intercepting both the northwest and southwest monsoons. Its area is one-half that of Wisconsin and its population one-third greater. The island has been under the control of the Portuguese, Dutch, and finally the British under whom it has attained excellent development.

Agriculture is the industry which gives the island prominence, and presents an interesting history in its development. Up to about 1877, coffee was the staple product of the farms, and in fact it grew wild, but because of a fungus disease the cultivation of coffee became a total failure. The grade of the coffee was poor but nevertheless, exported by the Portuguese in large quantities. In 1824, the West Indian plan of growing the plant was introduced and ten years later, the failures of other producing regions drew attention to Ceylon and by 1877 the output was 103,000,000 pounds. Then came the blight.

The natives turned immediately to a widespread cultivation of cinchona while they experimented with increased tea production. The cinchona was produced so rapidly that in one year 15,000,000 pounds of the bark were exported and the price per pound of quinine fell from $4.00 to $.36. Then the plantation method of tea production was introduced by the British with wonderful success. Plantations with an average of three hundred acres were financed by Europeans and managed by their energy and skill. Abundance of cheap labor was available constantly from southern India and the island itself. Unlike coffee, the tea plant was cultivated from sea level to 7,000 feet elevation and the eucalyptus tree, Indian and Japanese conifers, were planted among the tea plants to afford protection from the winds. The new application of fertilizer and the interplanting of nitrogen producing plants helped to restore to the soil the constituents conducive to the growth of the best tea plants. The finest trees grow on the highest elevations, but the quality varies in the different estates from season to season and from week to week. The use of the most scientific devices by European mana-

gers, reduced the price of tea to such a low figure that China's export fell rapidly and a commission from that country went to Ceylon to learn the new cultivation methods. The resulting over-production, increased plantings, and the low price led the plantation owners to turn their efforts to the newer, high priced tree crops such as cacao and rubber. In some estates rubber trees have supplanted those of tea. To this plant also, the new scientific methods of production have been applied, with very good results. Such employment of improved methods has transformed Ceylon from a declining to a progressive dependency.

ARTHUR G. TILLMAN,
La Crosse, Wis.

THE SHETLAND ISLANDS

THE Shetland Islands, a group of one hundred islands lying about fifty miles northeast of Scotland, have a coast scenery which is strikingly picturesque with its stern and precipitous cliffs, at the foot of which the deep sea has worn numerous caves. The irregular, rocky surface, rising into hills of considerable elevation, e. g., 1475 feet on one of the islands, furnishes bleak and dreary inland scenery, for there is scarcely a tree, although the remains of birch forests have been found in the numerous peat-bogs on some of the islands.

The people of the twenty-seven inhabited islands are of Scandinavian origin and hence very different from the natives of other parts of the British Isles. They are physically a fine race and the old Norse type of tall, fair-haired and blue-eyed persons has been little changed by the influx of Scots. In spite of their hospitality, soft voices, and outward courtesy one often finds a marked reserve, probably due to centuries of oppression combined with a system of social economy which tends to produce duplicity. They have an intense love for "The Old Rock," as they call their native land.

Since 1766 this archipelago has been the Earl of Zetland's property, which is now rented to the peasants in crofts of five to twenty acres, for the old system of "runrig" or cultivation of alternate rows has practically disappeared. The peasants combine farming and fishing, for the women and men respectively carry on the work. The poor soil has limited the agricultural progress of the islands, where the primitive method of spade tillage and seaweed manure is still used. Their domestic animals,—cattle, sheep, and horses—are of Scandinavian origin and diminutive in stature. These horses are the famous Shetland

ponies, which are believed to have become dwarfed from centuries of neglect and starvation. Their thick, shaggy coats help them to live through the long winter months out on the hills; but yearly a considerable number perish from exposure and want of food. They average about ten hands or forty inches in height and in their color there is a great variety, e. g., black, dark bay, and iron grey, considered best by some. Owing to being entirely grass-fed, their round, distended bellies detract from an otherwise thoroughbred appearance. So docile are they that the only breaking is in bringing peat home from the hills. Large numbers of them are shipped south to work in underground collieries. However, with the introduction of a system of roads, beginning in the late forties, to give the starving population employment during the failure of the potato crop, a breed of greater draught-power is gradually taking the place of the pony. Its value to the natives is shown by two laws, e. g., (1) anyone found riding his neighbor's horse is liable to a fine proportionate to the distance at which he is caught from the owner's parish and (2) cutting the mane or tail of another person's horse makes one liable to a fine and on a second offense he is treated as a thief. The horse-hair is used in making fishing lines, which are so important here, since the sea really furnishes the living of a majority of these people.

From Lerwick, the capital of these islands, deftly woven shawls, gloves, and colored hosiery are sent, for the women make these in their homes from the long, fine wool plucked rather than sheared from the sheep, which bear close resemblance to goats.

These islands together with the Orkneys form one county and send one member to Parliament.

LOUISE HUDSON,
Charleston, Ill.

THE BEGINNINGS OF GEOGRAPHY*

OF course it was important that I, as a boy, should know that Minneapolis, Minnesota, was a great milling center, though just why it was important I did not then and do not yet know. It had no bearing on my business at that time and it was not only painful to try to remember it, disconnected as it was from my experiences and interests, but it was of no significance to me. It was merely an abstract thing to be memorized largely for policy's sake, for I knew that it would also be painful if I was not able

*Abridged from an article by L. D. Wooster, in "Teaching" No. 36, published by the Normal School, Emporia, Kans.

to say, when the proper time came, "Minneapolis, Minnesota, is a great milling center." It was a case of either being able to say that Minneapolis was a great milling center or of my becoming one myself and I, personally speaking, usually chose the former, using this specific example, of course, to represent a general condition.

But in the meanwhile there stood in the town in which I lived and learned, a mill, a perfectly good mill, a most interesting mill, the inside of which to this day I have never seen. As a boy I now and then passed that mill and longingly looked in through the open doors, wishing that I might see the enclosed mysteries. And all the time in which we studied that "Minneapolis, Minnesota, was a great milling center" our local mill stood patiently by waiting to be used as a real lesson in milling. And suppose my teacher had suggested that we go through the local mill! My! what a sudden impetus to interest and enthusiasm! And would we go after school? "Sure." (In other words we would stay in after school gladly to study our geography lesson.)

And why all this sudden interest? Because childhood is the time of the reign of the senses; the time when eyes, ears, and so on are gathering in the great mass of materials upon which in later years we can build our imaginations and learn to see the world beyond our immediate ken.

Goodness knows that if we could ever catch up with what we want to know right now we would be accomplishing the impossible. And if we only think of it in sympathetic terms of childhood, Johnnie has just as much that he wants to know now as we grown folks have, and what he wants to know is just as important to him as what we want to know is to us. And furthermore, if he learns half of the things and solves half of the problems which come to him in very real form he will have gained a tremendous fund of knowledge by the time he is grown.

Nature Study

In the first three or four grades of school work, geography takes purely nature-study form, except for stories. Learning to know the birds, the flowers, the trees, the rocks, the clouds, the wild animals, the weeds, and so on is very much worth while. It develops the instinctive desire to observe and to know. Fortunate indeed are the boys and girls who have the advantage of teachers who take the nature-study way of doing things (for nature study is an attitude of mind rather than a subject to be added to the curriculum).

The Shadow Stick

Longitude and time is one of the great bugaboos of geography. The first thing that school children know or hear of the subject is usually the name. And the name ought to be about the last thing they hear. Gradually, month by month and year by year, they can learn to observe the effects of earth motions and so on, and by the time they are ready for the specific subject they already have a good, simple conception of it.

To make a shadow stick, take a smooth board about a foot square. Drive a nail about two inches long through the center of this board. Place this board in a window where the sun will shine on it as much of the day as possible, or better yet, fasten it firmly on top of a post in the school yard where the sun will shine on it all day long. If a window is used be sure that the shadow stick board can always be placed in exactly the same position when in use.

Now begin observing the shadow of the nail on the board at different times of day and at different times of the year. On certain dates mark the point of the shadow at different times of day. Then two weeks or a month later mark the shadows at these same hours again. What changes have taken place?

1. At what time of year are the shadows longest? Why?
2. At different times of the year will the shadow always be in the same straight line at a certain hour?
3. On what date will the shadow be longest? Shortest? Why?
4. Is the shadow straight north and south at noon? Explain.

The above questions are for the teacher rather than for the pupils. Let the children do the marking. Let them discuss the changes and ask most of the questions. The teacher is merely an unobtrusive guide, supervisor and planner.

The shadow stick can be made by a boy in a few minutes time. Get one to volunteer to do it. He will be tickled at the chance to do something.

This simple contrivance can be the beginning of many questions and much real thinking. The writer guarantees that the shadow stick will even make a teacher think, sometimes. But never mind that, you can stand it once in a while.

Star Study

Observation of the stars, the planets, the moon, and so on will be the beginning of some fine, large conceptions of things. The growing consciousness of the size of the universe, of the laws

which unfailingly govern its motions and the relation of the earth to it all are worth while. I wish that every child could have the advantage of a guide to some of these things.

Begin by helping the children to locate the North Star, then the Big Dipper, later the Little Dipper. Children a little older can learn to know Orion (in January is the best time). Find the story of Orion and tell it to them. The brightest fixed star is Sirius. It rises after Orion. In January it is not far above the eastern horizon.

Get an almanac; a medical one will do. Find out what planets can be seen. Just now (January, 1917) Jupiter (the biggest of the planets, diameter 90,000 miles. What is the earth's?) is visible as the brightest star in the evening heavens almost overhead in the evening. Venus is the bright star in the east in the morning. Find some of the myths about Jupiter and Venus.

1. What do we mean by new moon, full moon?
2. Why does not all the moon look bright all the time?
3. How often do we have a new moon? Why?
4. How much later does the moon rise each succeeding twenty-four hours?
5. Are the fixed stars in exactly the same place night after night throughout the year? Explain.
6. What ideas of the motions of the earth can finally be gained by watching the sun, moon, and stars?

Weather Study

Now and then ask the children what kind of clouds are in the sky. Get a cloud chart, free, from the United States Weather Bureau, Washington, D. C. When it snows observe the snowflake crystals.

How many points are there?

Do they all have the same general plan?

Children in the middle and upper grades can begin keeping records of the weather. Each day at the same hour record the temperature, wind direction, kind of clouds, rain or snow fall, and so on. Make this record in the form of a chart, in columns.

Weather (climate) is one of the fundamental elements of geography. And local observations and studies are more important than the weather of Africa or China or Alaska or any other distant place in these early years of schooling.

Collections

Children are largely creatures of instinct. Education is largely a process of developing these instincts. The teacher is the

guide who directs these instincts in the right channels.

One of the most usable of these is the collecting instinct. The following is a list of collections which can be made:

1. Minerals, stones, fossils, and so on from the neighborhood.
2. Samples of sand, soil, and so on collected in small bottles.
3. Study coal. Tell the story of its formation.
4. Kinds of wood, bark, twigs, and so on of the home region.
5. Weed seeds, crop seeds, and so on in bottles.
6. Pressed collection of grasses and weeds.
7. List of wild animals of the region.
8. List of the wild birds of the region.
9. List of wild fishes of the region.

These are merely suggestive. There are other collections which can be made. The doing of what may seem a trivial thing to a grown person may mean much to a child. The above collections are not trivial in their value. They are real geography to children.

Miscellaneous

It is much more important in the beginning that boys and girls should learn to see and read the story of their own hills, valleys, rivers, and plains; that they should see the deposits of sediment, the gullies, the transportation of pebbles, the gradation of soils and other effects of a good Kansas shower in the gutter of a sloping street or road; that they should visit their own factories (broom, pop and so on, however, insignificant they may seem), flour mills, ice plants, repair shops and other industries, however small, than that they should know that Brockton, Mass., is a big shoe manufacturing city.

GEOGRAPHICAL MATERIAL ON SOUTH AMERICA

Latin America and the War

On Sunday, June 3, in addressing, by invitation of the Governor of Maryland and the Mayor of Baltimore, a great open-air Liberty Loan mass meeting held in that city, Mr. John Barrett, Director General of the Pan American Union and former United States Minister to Argentina, made the following statement, based on the editorial attitude of over 250 newspapers of Latin America and numerous letters received from Latin American statesmen, regarding the possible entrance of the other American Republics into the war:

"That the whole Western Hemisphere will be directly en-

gaged in the war before another year passes is now not only possible but very probable. Speaking unofficially, for no one can speak today in this crisis for all America, but basing conclusions on the consistent attitude of the Latin American press and the expressed opinions of Latin American statesmen, it can be said that, despite the justifiable and even praiseworthy neutrality of some of the Latin American countries, there is no question whatever that it now looks as if events would inevitably cause all of them to align themselves with the United States and its European allies and even take such steps as will be equal to a declaration of war.

"The preponderating public sentiment everywhere in Latin America is undoubtedly pro-American and Ally. The governments remaining neutral cannot be described as being in any way under German influence. It may be that it would be far better for the eventual best interests of the United States, Great Britain, France and Italy if they would remain neutral. Certain mighty and irresistible but almost intangible forces and influences of both sentimental and economic character cannot be checked. The tide of Pan-Americanism is undoubtedly rising with a new power and a new opportunity to save world civilization, and at this hour it looks as if the flood would carry all America with it."

Conditions in Peru

Peru, in common with other South American countries, has seen an astonishing rebound from poverty to unprecedented prosperity during the war period.

Exports from Peru, chiefly sugar cane, cotton and copper, are now six times imports, and as exports are taxed the Government finds itself in ample funds. The cotton, long and fibrous, sells for thirty-five to fifty cents a pound, and more and more of it is finding a better market here than abroad, due mostly to efforts by American bankers in Peru.

The exports of cotton in 1916 amounted to $8,359,763, and the exports of cottonseed reached 47,135 tons. These figures are the largest on record in the Peruvian cotton industry. Great Britain was the chief buyer.

The foodstuff situation is critical. In April the Government put an embargo on food exports, as high prices were too strong a magnet for farmers and planters to resist.

Since May first of this year passenger fares between all points on the west coast of South America have been advanced 15 per cent. This is the second increase in passenger rates since

the beginning of the war in Europe, the previous advance having been 20 per cent. As announced in the newspapers of Lima, the present increase in rates is due to the greater cost of fuel and ship supplies and the higher wages for officers and crews of merchant ships.—[*The South American.*]

Vegetable Ivory

Along the Pacific Coast, from Panama to northern Peru, there grows wild a stunted palm fern, called the Tagua Palm, which yields an excellent substitute for the elephant tusk product in the manufacture of small articles.

The Ivory Nut provides a rather miserable livelihood for the negroes and half-breed Indians living along that coast, but exports of this product were increasing very rapidly before the war.

The Tagua Palm grows from ten to twenty feet high, with a very short trunk, and the fruit is somewhat similar to the cocoanut, growing from four to nine drupes to the tree. The drupes weigh nearly 20 pounds, grow to about the size of a man's head, and consist of a woody, fibrous, wart-covered wall that incloses the seed proper, which are of hard white composition, small-potato sized, fine grained, and approaching real ivory in all characteristics. The heads hold from six to nine seeds. Natives gather the fruit of the tree, taking those nuts found on the ground which are matured. The principal use of this curious product is in the manufacture of buttons.—[*The South American.*]

The Platinum Supply of Colombia

The importance to the United States of the platinum mines of Colombia may be gauged from the fact that this country requires an annual supply of the precious metal exceeding 165,000 troy ounces, and whereas Russia produced only 63,900 ounces last year, and the rest of the world 1,032 ounces, Colombia improved her previous record by 39 per cent, sending 25,000 ounces of crude platinum to be refined in the United States.

The progression of Colombia's production has been steady and constant from 6,000 ounces in 1909 to 18,000 in 1915 and 25,000 in 1916, but as the price of platinum has quintupled during this period, the importance of this item of exports may be said to have multiplied twenty-one times.—[*The South American.*]

Santos and Sao Paulo, Twin Cities of Brazilian Trade

Sao Paulo is the richest state of Brazil. Reputed as the

greatest coffee-producing country in the world, Brazil furnishes 80 per cent of the total coffee consumed. Of this, the state of Sao Paulo contributes seven-eighths of the whole and nearly 70 per cent of the world's supply. Though famed for coffee, it produces almost anything else, doing a large export business in rice, sugar, cotton, tobacco, cocoa, wheat, corn and other cereals.

Santos which is really the port of Sao Paulo, is one of the busiest spots in South America. Over 1700 steamers besides the sailing vessels, enter and clear this port of 70,000 people. All day long, and also during the night at some seasons, an endless string of stevedores are seen carrying sacks of coffee from the railroad cars on the wharf to the ships lying alongside. Some thirteen to fifteen million bags are loaded annually. The largest ocean liners anchor alongside the quay which extends three miles down along the front of the town. Three lines of railway link the port with the railway station; five warehouses line the docks, and the best hydraulic and electric machinery is used to receive and discharge freight. All in all Santos is the best equipped port in Brazil, notwithstanding the fact that Rio de Janeiro is reported to have one of the three finest natural harbors in the world.

The Sao Paulo railway, extending from Santos to Judiahy and passing Sao Paulo half way, although only 100 miles long, is for its length the most profitable railroad in the world and at the same time ranked by experienced engineers among great mechanical achievements such as Brooklyn and Forth bridges. It makes the ascent of 2600 feet in seven miles. Beginning fifteen feet above the sea, five inclined planes have been constructed with a grade of 8 per cent, each a mile and a quarter long. On these the trains are worked by wire-rope haulage; each incline has its own power house and haulage plant, and safety is secured not only by the "locomotive brake" which is attached to the last car of each ascending and descending train, but also by the simultaneous descent and ascent of trains each way. The extraordinary completeness and finish of every part not only of the roadbed and rails but also of the stations and other buildings, iron bridges and the thirteen tunnels, all speak for the unusual success and prosperity of the line as a business undertaking. For its length it is the richest in the world. The dividend assignable to the shareholders is restricted to 17 per cent, so that the directors spend their surplus in securing not only efficiency and security but even elegance. The saying current among foreigners in Brazil is that the only thing that remains to be done upon the Sao Paulo and Santos line is to gild the tops of the telegraph poles.

Down this cable railway comes the exportable produce of the State of Sao Paulo and the hinterland tributary to it. The trains, at busy times, run continuously day and night, and by steady schedule carry along this one line the traffic that has focussed upon Sao Paulo through the radiating lines on the plateau. There is so much more freight descending from Sao Paulo to Santos than goes up that frequent passenger trains in both directions, and all up-bound trains, are moved largely by the weight on the cables, the steam power at the five stations being used for controlling and steadying the motion of the cables. The forty-mile trip between the two cities requires two hours.

Sao Paulo, called "Santos on a hill," is one of the oldest cities in the New World, founded in 1558 by Portuguese and Spanish immigrants. Living in the healthy uplands, the people of Sao Paulo have shown great industrial and political activity. Since 1875, when coffee was first cultivated extensively, it has grown from a country town to a city of 700,000.

The plateau air is keen, though the summer sun is strong. The nights are cool. The winter, which sometimes brings slight frosts, insures physical vigor. Senator Root declared when he was visiting the country, "There is something in the air of Sao Paulo that makes strong and vigorous men."

Sao Paulo is not only the capital of the State, but a notable center of education and industry, and the home of many men of great wealth. There are 384 industrial houses with an annual output of $46,500,000. One is impressed by the fine modern factories built on a large scale where the best machinery is used with electricity as the motive power.

The larger businesses, both commercial and industrial, are chiefly in the hands of foreigners: Italians, Germans, and English, with a few French.—[*The Americas.*]

SILK

IN 1915-16 the United States imported 40,500,000 pounds of raw silk valued at $126,000,000. This does not take into account overhead charges, interest and other expenses which bring the total investment in the raw commodity for the season up to $155,000,000.

The raw silk brought into the United States in the last year comprised 61 per cent of the production of the entire world. Of the amount imported last year it is interesting to take note that Japan furnished 70 per cent, China 17 per cent and European nations and miscellaneous sources the remainder.

The most picturesque part of the silk industry is the production of the cocoons. The silk worm of commerce, the caterpillar called *Bombyx Mori*, comes from an egg which is about the size of a pinhead, about 40,000 of them making an ounce. The worms measure from 3 to 3½ inches in length at maturity. The eggs are laid in the spring and are kept through the winter at a low temperature in well ventilated, dry receptacles. Then in May when the white mulberry trees upon which the larvae feed are ready the eggs are hatched out, either in artificial incubators or by natural heat.

The nearness of the hatching is indicated by the whitening of the eggs, which are placed on flat receptacles and covered with finely perforated or crepe paper, sprinkled with small cut mulberry leaves. As they come out the young caterpillars mount through the infinitesimal apertures to the surface, upon which is the food. They eat voraciously, being fed from eight to ten times every 24 hours, and after each feeding the lower sheet of paper is removed. At the sixth day the worms begin to moult their skin and pass into the second stage. As they increase in size, paper with larger perforations is used and this is repeated until the fifth stage is reached. After five days in the latter condition the worms are nearly full grown and ready to spin. Their appetites are particularly large at this stage. They are generally pretty good eaters, except just before they are ready to moult.

When it is ready to start on the cocoon the worm ceases to eat. First he produces from the silk-containing organs, which are two large glands or sericteria on either side of the body terminating in spinnerets at the mouth, a rough fibre that forms the outside of the cocoon. This and the following finer fibre is composed of two filaments formed from the viscous fluid in the glands and united at the mouth by the gum which is ejected there. The ordinary cocoon produces a fibre from 800 to 1,000 yards long. Once the outer coating is completed, the more closely disposed and valuable material that makes up the interior is reeled out, the worm engineering the operation by a circular motion of its head. Absence of sound from within the cocoon indicates that the worm has finished his work and has passed into the chrysalis stage. The cocoons are then picked off the spinning frames and are sorted out by experts. Certain ones are put aside for the extremely eugenic processes of breeding, the difference of size and shape indicating sex. Those that are dead are also detected and picked out. Then those that are to be used for reeling are put in an oven with a gentle heat that kills the chrysalis. The cocoons are now ready for the first stage

in the manufacturing process, which consists in the removal and winding of the fibrous covering.

In order to remove the silk from the cocoons they are soaked in warm water which loosens the gummy substance binding the filaments. The single fibre is not tenacious enough, so from four to eighteen, according to the size of thread desired, are taken and are passed through two sets of guides, each of which imparts the indispensable twist or crossing that causes the adherence together of individual fibres.—[Excerpted from *Asia.*]

RABBITS IN AUSTRALIA

PROF. Sidney Dickinson gives the following valuable notes on the rabbits of Australia:

"The average annual cost to Australasia of the rabbit plague is nearly $3,500,000.

"The work which these enoromus figures represent has a marked effect in reducing the number of rabbits in the better districts, although there is little reason to suppose that their extermination will ever be more than partial. Most of the larger runs show very few at present; and rabbit-proof fencing, which has been set around thousands of square miles, has done much to check further inroads. Until this invention began to be utilized it was not uncommon to find as many as a hundred rabbiters employed on a single property, whose working average was from three hundred to four hundred rabbits per day. As they received five shillings a hundred from the station owner, and were also able to sell the skins at eight shillings a hundred, their profession was most lucrative. Seventy-five dollars a week was not an uncommon wage, and many an unfortunate squatter looked with envy upon his rabbiters, who were heaping up modest fortunes, while he himself was slowly being eaten out of house and home.

"The fecundity of the rabbit is amazing, and his invasion of remote districts swift and mysterious. Careful estimates show that, under favorable conditions, a pair of Australian rabbits will produce six litters a year, averaging five individuals each. As the offspring themselves begin breeding at the age of six months, it is shown that, at this rate, the original pair might be responsible in five years for a progeny of over twenty millions. That the original score that were brought to the country have propagated after some such ratio, no one can doubt who has seen the enormous hordes that now devastate the land in certain districts. In all but the remoter sections, however, the rabbits

are now fairly under control; one rabbiter with a pack of dogs supervises stations where one hundred were employed ten years ago, and with ordinary vigilance the squatters have little to fear. Millions of the animals have been killed by fencing in the water holes and dams during a dry season, whereby they died of thirst, and lay in enormous piles against the obstructions they had frantically and vainly striven to climb; and poisoned grain and fruit have killed myriads more. A fortune of 25,000 pounds sterling offered by the New South Wales Government still awaits the man who can invent some means of general destruction, and the knowledge of this fact has brought to the notice of the various colonial governments some very original devices."

NEWS NOTES

Professor Lawrence Martin, associate editor of the Journal of Geography, has been commissioned a First Lieutenant in the U. S. National Army and has been granted a leave of absence from the University. On this account his name does not now appear as associate editor of the magazine. All honor to Professor Martin.

Number 36 of *Teaching*, a bulletin published monthly by the State Normal School of Emporia, Kansas, is devoted to geography. It contains four stimulating articles:

The Beginnings of Geography by L. D. Wooster.

Geographic Factors Influencing the Movement of Population in Kansas by Jane K. Atwood.

The Problem Method in Geography by Jennie Williams.

The Socialization of Geography by A. F. Senter.

There is also an account of the Kansas Council of Geography Teachers.

Professor L. H. Wood, head of the Department of Geography of the State Normal School, Kalamazoo, Michigan, sends the following item which will be encouraging to normal school teachers of geography who are trying to get more time for their subject in normal schools:

"Our faculty has turned out a new course of study, in which two courses of geography are required for all who teach in grades 3-6. We shall make the work a study of the sequences of climate and the application of the formulae of climate to type climatic regions, and for the lands a similar development, using physiographic formulae in the study of the more progressive of regions, 'geographic masterpieces' we call them."

though the enrollment in the 1917 Summer Session of the

University of Wisconsin was nearly 800 less than in 1916, the geography classes were larger than in 1916. There is an unmistakable growth of interest in geography teaching. More candidates for advanced degrees in geography enrolled for absentia work this year than ever before.

RECENT PUBLICATIONS

THE UPPER ILLINOIS VALLEY. Bulletin No. 27, Illinois Geological Survey. By Carl O. Sauer. 208 pages. 1916.

This is the eighth in the Illinois series of Educational Bulletins issued by the State Geological Survey. Like its predecessors it is an excellent piece of work in every particular. Mr. Frank De Wolf, Director of the Survey, and Professor R. D. Salisbury, who is in charge of the Educational Bulletins, are deserving of the thanks of geographers generally and of those of Illinois in particular for the high standard set by these bulletins. Mr. Sauer is to be congratulated upon his contribution to the series.

The volume consists of seven chapters covering topography, geology, glacial history, present active physiographic processes, settlement and development. There are 69 figures, including half tones, diagrams and sketch maps. The final chapter, dealing with the influence of the river and valley upon the human geography of the region, is especially interesting. It contains among other things an excellent account of the rise and decline of the Illinois and Michigan Canal. It is to be hoped that the Illinois Geological Survey will continue the preparation of these valuable bulletins.

AROUND THE WORLD WITH THE CHILDREN. By Frank G. Carpenter. 133 pp. The American Book Co., N. Y. 1917.

Every teacher of geography welcomes anything written by Frank Carpenter. This little book is an introduction to the study of geography, and it is the right sort of introduction. It takes the pupil among the Eskimos, the Indians, the people of Tropical Africa, of Japan, China, the Philippines, to the Sahara, the Alps, the Rhine, and to Holland. This is precisely the process by which children are brought to see the use of studying geography and by which they acquire an interest in it at the beginning. The half tone cuts and the colored pictures are excellent.

ELEMENTARY GEOGRAPHY, 360 pages; ADVANCED GEOGRAPHY, 439 pages; by Harmon B. Niver. Hinds, Hayden and Eldredge, Inc., New York. 1915 and 1916.

The books are 8 x 10 inches in size, well illustrated and interestingly written. The political maps are clear but not always attractive in appearance; the physical maps are fair; the map and review questions are good.

The books show merit in certain particulars but they lack the accuracy which sound geographical knowledge alone can give. Such statements as the following occur, speaking of the rivers of the Alps: "The same force that shaped the courses of the streams has arrested their flow in hundreds of places, forming lakes of great beauty," etc. Of course, the "force" (?) that shaped the courses of the streams is quite different from that which caused the lakes.

New Commercial Wall Map of South America. Rand, McNally and Co., Chicago, are offering a new wall map of South America, 46 by 66 inches, 80 miles to one inch. Boundary lines are conspicuously shown and disputed territory is indicated. Provincial boundaries, railroads, steamship routes and all important physical features are shown. Different sizes of type are used for the names of cities of different sizes. Apparently all villages even of very small size are indicated on the map. The regions around Rio de Janeiro, Buenos Aires, Valparaiso, and Bogota are shown on a larger scale by insets. An unusual feature of the map is the use of a symbol to indicate just how far steamboat navigation on the rivers is possible. Names are printed in the language of the country.

A cross reference index containing a list of all cities and towns in South America (with population) is supplied in the form of a booklet. The map is a distinctly valuable contribution. Mounted on plain rollers $15.00; on spring rollers in case $18.50.

QUESTIONS ON SOUTH AMERICA

1. Give the main causes for the backwardness of South America commercially. To what extent are these causes geographical?
2. Where in South America is the rainfall excessive? Where moderate? Where deficient? Give reason in each case. Show the general effect of this upon the chief industries of the regions.
3. Name five great rivers of South America. Tell something of their use in commerce.
4. What and where are the llanos, pampas, selvas, campos? To what use are they respectively put? Why?

5. Tell why all of the Andean countries are under certain serious disadvantages. Name the chief ones.
6. What is Brazil's most serious disadvantage? Argentina's? Chile's?
7. What are the most favoring conditions in each of these countries?
8. Summarize the important facts about (a) the railroads of Brazil, (b) the coast line and harbors, (c) the mineral resources, (d) the agricultural resources, (e) the manufactures, (f) the foreign trade.
9. Do the same for Argentina; for Chile.
10. Why do we buy so much more from South American countries than we sell to them? How can this unbalanced condition be remedied? How is the present war likely to affect our future trade with South America? Explain.
11. What European countries largely dominated the foreign trade of South America before the present war? Why?
12. What does South America supply us in large quantities (5-10 articles)? What do we supply to South American countries?
13. Discuss the probable effect of the Panama Canal upon our trade with western South America.
14. Why are most of the cities in western South America situated high up on the plateaus?
15. What minerals are the Andean countries capable of producing in large quantities? Why are most of them not more largely produced?
16. Tell something of the extent to which foreigners and foreign capital are interested in the large industries of South America?
17. Locate the capital of each of the South American countries. Also Para, Valparaiso, Callao, Guayaquil, Santos, Manaos, Maracaibo, La Guaira, Sao Paulo, Rosario, Bahia.

Montana produced gold, silver, copper, lead and zinc to the value of $134,000,000 in 1916. All but six million dollars of this came from the single small county of Silver Bow in which Butte is situated.

More than 98 per cent of the native sulphur produced in the United States is now obtained in Louisiana and Texas. Not many years ago we were importing most of our sulphur from Sicily. More recently we got it from Japan. Now we export far more than we import. The rich sulphur deposits of Texas are at the water's edge at the mouth of the Brazos River and sulphur is loaded directly into sea-going vessels.

NEW OIL FIELD IN KENTUCKY

THE Irvine oil field in Kentucky, has developed from nothing three years ago into the richest oil territory in the State, and a dead-and-alive town of 300 people has expanded into a city of 6,000 inhabitants.

Now, after three years, a profound change has affected the people of the region and their activities. The little-used mountain trails are widened and deeply worn into rocky roads, over which 6-mule teams struggle to pull or hold back small loads of steel pipe and machinery. The mountain stillness is broken by the staccato "pup, pup, pup," of scores of gas engines, most of them hidden from view in the shrubbery. The poverty-stricken mountaineers, who cared little for titles, precise acreage, position of boundary lines, or court proceedings, are now hiring lawyers and surveyors to solve intricate questions of ownership. Some are now wealthy and are growing wealthier through their tithe—or rather their eighth—of the oil found on their farms.

Some farms that were worth a few hundred or a thousand dollars three years ago would now bring a million or more.

The Irvine oil field is in several respects unique. It is by far the richest yet developed in Kentucky. The field is in a region where oil showings have long been known and oil has long been sought, and yet somehow this great pool 10 miles long and 2 miles wide was missed.

Most of the oil produced in the United States comes from beds or "sands" that lie one, two, or three thousand feet below the surface and many miles from an outcrop of the bed at the surface. The west side of the Irvine field is within a mile of outcrops of the oil-bearing bed, which may be seen at several places in and around Irvine. Some of the wells are less than 100 feet deep and yet furnish good yields, even the oldest showing a relatively low rate of decline.

SECRETARY OF NATIONAL COUNCIL PRESENTS LIST OF AVAILABLE SPEAKERS ON GEOGRAPHY

To State Directors and Others—

For some little time I have been trying to compile a list of speakers for teachers' association meetings and especially for the meetings of State Councils. The following is a preliminary list. It contains the names of those who are now thought to be available. It is probable that the list should be much larger. I desire that you send to me the names of others who are willing to do this sort of work. Please do not hesitate to include yourself. Those marked with an asterisk are known to be available for general sessions. Through your cooperation we will be able to establish a complete list.

I wish also to suggest the possibility of cooperation with other State Councils in securing a speaker. Such cooperation may enable you to circuit a speaker. Will you please send to me the date of your next meeting? I will be glad to assist in any way possible.

GEO. J. MILLER, Sec.

CALIFORNIA
*James F. Chamberlain, State Normal School, Los Angeles.
Roy E. Dickerson, 114 Burnett Ave., San Francisco.
D. S. Holway, State University, Berkeley.
H. W. Fairbanks, Berkeley.
Earle G. Linsley, Mills College, 3732 Emerson St., Oakland.
William Snyder, Hollywood H. S., Los Angeles.

COLORADO
G. A. Barker, State Teachers College, Greeley.

CONNECTICUT
*Richard E. Dodge, Washington.

GEORGIA
Frank Merrill, State Normal School, Athens.

IDAHO
Joseph Reed, State Normal School, Lewiston.

ILLINOIS
Rollin D. Salisbury, University of Chicago, Chicago.
Walter S. Tower, University of Chicago, Chicago.
J. Paul Goode, University of Chicago, Chicago.
Harlan H. Barrows, University of Chicago, Chicago.
Mabel Stark, State Normal University, Normal.
D. C. Ridgley, State Normal University, Normal.

INDIANA
Charles R. Dryer, Oak Knoll, Fort Wayne.
B. H. Schockel, State Normal School, Terre Haute.

IOWA
E. J. Cable, State University, Cedar Falls.

KANSAS
Jane K. Atwood, State Normal School, Emporia.

KENTUCKY
R. P. Green, State Normal School, Bowling Green.
Elizabeth G. Breckenridge, Normal School, Louisville.
Ellen C. Semple, 509 W. Ormsby Ave., Louisville.

LOUISIANA
F. V. Emerson, State University, Baton Rouge.

MAINE
E. E. Philbrook, State Normal School, Castine.

MASSACHUSETTS
W. W. Atwood, Harvard University, Cambridge.
R. deC. Ward, Harvard University, Cambridge.
Elizabeth Fisher, Wellesley College, Wellesley.
Sumner W. Cushing, State Normal School, Salem.
L. O. Packard, Boston Normal School, Boston.
Charles P. Sinnott, State Normal School, Bridgewater.
Nellie B. Allen, State Normal School, Fitchburg.
F. F. Murdock, State Normal School, North Adams.

MICHIGAN
Mark Jefferson, State Normal College, Ypsilanti.
R. D. Calkins, State Normal School, Mt. Pleasant.
Leonard L. Wood, State Normal School, Kalamazoo.

MINNESOTA
C. J. Posey, State University, Minneapolis.
Eugene Van Cleef, State Normal School, Duluth.

*Geo. J. Miller, State Normal School, Mankato.
S. S. Visher, State Normal School, Moorhead.
R. J. Scarborough, State Normal School, Winona.
*L. L. Everly, Asst. Supt. of Schools, St. Paul.

MISSISSIPPI
Willa Bolton, State Normal School, Hattiesburg.

MONTANA
M. J. Elrod, State University, Missoula
J. P. Dowe, State University, Missoula.
Walter Scott, State Normal School, Dillon.
*Grant E. Finch, State Normal School, Dillon.
O. W. Freeman, Fergus County High School, Lewiston.

NEBRASKA
N. A. Bengtson, State University, Lincoln.
G. E. Condra, State University, Lincoln.
E. E. Lackey, State Normal School, Wayne.

NEW HAMPSHIRE
*G. H. Whitcher, State Department of Education, Concord.

NEW MEXICO
*Alvan N. White, State Department of Education, Santa Fe.

NEW YORK
Albert P. Brigham, Colgate University, Hamilton.
*Frank McMurry, Teachers College, New York City.
*Charles T. McFarlane, Teachers College, New York City.
Clara B. Kirchwey, Horace Mann School, New York City.
Isaiah Bowman, Director American Geographical Society, New York City.

NORTH CAROLINE
Collier Cobb, State University, Chapel Hill.

NORTH DAKOTA
Howard E. Simpson, State University, Grand Forks.
J. R. Sweitzer, State Normal School, Valley City.

OHIO
Frank Carney, Denison University, Granville.
W. M. Gregory, Cleveland Normal School, Cleveland.

OREGON
W. D. Smith, State University, Eugene.

PENNSYLVANIA
G. B. Roorbach, University of Pennsylvania, Philadelphia.
J. Russell Smith, University of Pennsylvania, Philadelphia.

RHODE ISLAND
Robert M. Brown, State Normal School, Providence.

TENNESSEE
A. E. Parkins, George Peabody College for Teachers, Nashville.
*C. A. McMurry, George Peabody College for Teachers, Nashville.
C. H. Gordon, University of Tennessee, Knoxville.

UTAH
Anna Youngberg, University of Utah, Salt Lake City.

VIRGINIA
Loulie C. Kelley, John Marshall High School, Richmond

WISCONSIN
R. H. Whitbeck, State University, Madison.
Lawrence Martin, State University, Madison.
F. E. Williams, State University, Madison.
V. C. Finch, State University, Madison.
E. G. Lange, State Normal School, Whitewater.
F. E. Mitchell, State Normal School, Oshkosh.
J. A. Merrill, State Normal School, Superior.
L. T. Gould, State Normal School, Milwaukee.

TO OUR READERS:

In accordance with our custom, we are sending this number of the Journal to all whose term of subscription expired in June, even though such persons have not yet ordered the magazine continued. It is our regular practice to send it one month beyond the date of expiration, enclosing a "FINAL NOTICE" slip. We ask you to renew promptly. We do not like to drop names from our mailing list if there is a probability that the persons desire the magazine continued, but we have no way of knowing our subscriber's wishes except as they indicate them. The date of expiration is printed on the address label on the mailing envelope containing the magazine.

It is a matter of satisfaction to announce that despite a further advance in the cost of producing the magazine, the price will remain as before, $1.00 a year. This is made possible by the steadily increasing circulation. We shall count on a continuance of this growth and shall increase the size of the regular issues to 48 pages. Last year they were 40 and 48 pages in alternate months.

The Editor is very grateful to a large number of people who are constantly befriending the Journal, by recommending it to other teachers, sending in subscriptions and contributing items and articles. We have never had such a large number of manuscripts submitted as were sent in last year, many of which had to be carried over to the present school year. We solicit a continuance of your support and friendship and we will try to make the Journal worthy of them.

TO MEMBERS OF THE NATIONAL COUNCIL OF GEOGRAPHY TEACHERS:

Your annual dues of $1.00 may be sent directly to the Journal of Geography, Appleton, Wis. Your subscription will be renewed and the amount due the Treasurer of the Council will be forwarded to him.

R. H. WHITBECK, Editor.

The JOURNAL *of* GEOGRAPHY

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THE RELATIONS OF GEOGRAPHY AND WAR

By WALTER S. TOWER
University of Chicago

WARS are related to geography in two general ways. It is well known that the strategy of a war is largely determined by the geography of the country wherein it is waged, but it is not generally realized that most of the causes which force nations into war arise from geographic conditions. This second aspect is the more important part of the subject because the examination of causes of war suggests the answer to such world problems as the likelihood of making any peace permanent, and the effects on international politics which might come from a deliberate readjustment of geographic relations. It is well to begin the study of geography and war, therefore, with a consideration of causes, and then try to determine whether these causes can be removed or modified.

CAUSES OF RECENT WARS

The reasons for most of the recent wars, when analyzed, fall into three groups which may conveniently be called territorial, racial, and economic causes of war, all of them growing out of geographic conditions. Other issues, not at all related to geography, may be found in the events leading to some wars, such as was the case in the Spanish-American war. But with very few exceptions, in the last century or more, the big underlying issues fall under the three heads named. In some cases a single cause appears to have been mainly responsible, as in the influence of racial factors in the first Balkan War, or the clash of territorial interests which precipitated the second Balkan War. But in a good many, if not most, recent conflicts, two or all three of these typical geographic causes have been involved. It is advisable then to consider each cause in enough detail to know how it is likely to operate.

TERRITORIAL CAUSES

The territorial causes for war develop from two sources: the ambition to acquire new area, and the desire to recover area once occupied, but subsequently lost. These ambitions and de-

sires exist because nations, some large, some small, have developed in a more or less casual way in all sorts of locations, without intervening effective barriers to protect the weak from the strong, to check the clashing of rival interests, or to turn back the forces of aggressive expansion. None of the continents shows a close adjustment of national frontiers to prominent physical features. On the contrary, nearly all great nations have undesirable boundaries, such as those following insignificant streams or marked by purely arbitrary or artificial lines. This fact is shown strikingly by the map of Europe, and Europe in many ways has the most favorable configuration for logical subdivision. Along such unsatisfactory frontiers, rival interests or irreconcilable ideals may come so close as to set one nation against the other in deadly conflict; the notion that a relocation of the boundary might be advantageous may tempt one of the neighbors to try it; or the ambition for political aggrandizement may seem to have good chances of realization where no physical barrier stands in the way. Most of the wars in modern history show the presence of territorial causes.

Racial Causes

The racial causes of war, more prominent lately than ever before, exist because there are many distinct nationalities (people of common language and character) which are distributed without close adjustment to political boundaries or great physical barriers. The facts are illustrated better in Europe than in any other continent, because development of political units has gone farthest there. A growing spirit, called nationalism, has been strikingly manifest in nearly all these politically divided groups (like the Poles), within the last generation, due, probably more than to anything else, to the progress of education and well-managed campaigns in nationalistic literature. In general, nationalism may be defined as the idea of uniting all groups of one nationality under one rule and where an important group, like the Italians in Austria, is under a none too friendly domination, the issue may be acute. This development has increased friction between neighboring nations and fostered disloyalty among the races which are subject to an alien rule, as in the case of the Serbs in Austria or the Poles in Germany. The modern issue, known as *irredentism,* which figured so prominently in the first Balkan War and in the entrance of Italy into the present conflict, is only nationalism under another name.

Economic Causes

The economic causes of war have been of various sorts,

such as: the necessity of protecting industrial and commercial interests which are imperiled or interfered with by the activities of some rival; the desire to be freed from conditions which hamper industrial and commercial expansion; ambition to possess a larger share of the valuable resources of the world; and the need of providing for a rapidly growing, perhaps overgrown, population. Such issues are illustrated perfectly in the wars waged by Russia and by Japan during the last half century, and largely explain the present conflict.

Removing the Reasons for War

With these facts in mind, one may then consider the problem of removing these reasons for war. Of course, it ordinarily is assumed that geographic conditions are largely unchangeable, and, therefore, causes of war arising from geographic relations would be hard to eliminate. But for this discussion it may be assumed that any extent of re-adjustment of nations to their surroundings is possible, if such procedure would reduce the probability of war.

The only apparent way by which territorial causes might be removed is to relocate international boundaries, so that as far as possible they would adhere to the great natural barriers. In this way, countries would be made to correspond more or less closely to the larger physical divisions of the continents, and between neighbors there would be in most cases something of a natural limit to expansion, an obstacle to hostile operations, and a condition, therefore, which might tend automatically to decrease friction.

It must be noted, however, that the continents, as illustrated by Europe, have not the arrangement of topographic features needed to provide complete barriers for all the different national units for which provision would have to be made. Thus there would remain exposed frontiers across which friction might continue to develop as heretofore. Furthermore, as time goes on, physical barriers are becoming less and less effective as obstacles to hostilities, as shown by the Italian campaign in the Alps. Such an adjustment, also, would mean the elimination of most of the small nations of the world, since they occupy positions which are illogical when viewed from the physical standpoint. With the elimination of small nations, racial issues almost certainly would become more serious than ever, as, for instance, if Serbia were added to the Dual Monarchy, or Belgium to Germany. Finally, the physical units of the continents are of varying size and desirability, as a result of which, eco-

nomic inequalities still would cause jealousies and probably strife. Little relief, therefore, could be gained by redistribution of the lands among the many nations.

The only way to remove the racial issues would be to adjust political boundaries to the limits of national groups, and find some means to insure each unit a continued independence. But population groups are not distributed with reference to natural boundaries any more than they conform to existing political limits. For such countries, then, there would be a multiplication of exposed frontiers, one of the conditions most favorable for the development of international discord. Furthermore, racial groups vary greatly in numbers, and thus in strength, and they are not similarly located with reference to economic advantages. As a result of these unavoidable differences, the problem of the strong against the weak, or jealousy of the poorly endowed toward those more fortunate in their possession of natural resources, still would remain as reasons for war.

There is no apparent way of removing the economic causes, which seem of late to be the most effective of all in precipitating wars. The distribution of natural resources and other advantages for national progress is so complex that nothing like an equitable division among all nations could be accomplished. The location of important minerals, like coal and iron, or of highly productive crop land, bears no unvarying relation to the logical physical units of the different continents, or to the distribution of racial groups. The mere difference of location gives one area, like France, a vast advantage over another, like Hungary. Thus, however the adjustment of boundaries might be made on physical or ethnic bases, inequality of economic opportunities still would remain. In fact, every aspect of the question shows that there always must be some countries fortunately placed and heavily endowed with resources, while others, isolated and relatively poor, are likely to feel the urgent need of changing their status by force of arms.

Since it appears impossible to remove these causes of war, or reduce their effectiveness, one should then consider whether geographic influences are operating in new ways such as might produce more frequent or less frequent causes for war. Three reasons might lead to the conclusion that an increase is not unlikely.

Looking to the Future

The number of countries in the world is increasing. In Europe, for example, the last hundred years have seen the addi-

tion of ten new nations, and in other continents new countries have appeared, some of which already have ambitions to be recognized as world powers. The larger the number of nations within the limits of a single continent, the larger the number with world interests and far-reaching ambitions, the more favorable are conditions for war-provoking issues to develop. A hermit nation may be peaceful as long as it has no one with whom to quarrel, but Japan, after many years of hermit-like existence, began to develop outside interests and now has a record of participating in three wars in the brief space of twenty years.

National security arising from location, like the commonly mentioned "splendid isolation" of the United States, has disappeared, due partly to the development of new countries, but more largely to the ways in which man has conquered various natural obstacles. It is difficult to comprehend the changes which have come between the time when forests and swamps and rivers isolated the different tribes of Germany so effectively that they developed into independent kingdoms, and the present, with its remarkable ease of intercourse between remote parts of the world. Effective natural barriers hardly exist now. Distances no longer count for much and mountains which once checked peaceful intercourse are now the battleground for great armies. Even the ocean, long a most effective factor for isolation, now must be regarded as affording a remarkable degree of accessibility, within certain limits, perhaps the easiest avenue to follow for hostile purposes. Remoteness from centers of strife, great as its value may have been in the past, no longer can be counted on as a guaranty against war, for economic interests, far-flung, must be protected. The world is a unit.

Finally, with the steady advance of most of the long-settled parts of the world toward the full utilization of natural opportunities, there is greater chance for conflicts arising from economic interests and political ambitions. Economic and commercial domination by a single country, so typical of the past, has replaced by keen and bitter rivalry among a constantly growing number of near equals. A century ago there were but two first-class powers; today probably no less than eight nations must be so designated. A century hence there may well be a dozen, if the value of natural opportunities has been judged correctly. Economic needs, like problems of food supply, which did not exist a generation ago, now stand as primary issues in the affairs of great nations. Apparently, too, they must continue to increase. Areas and resources once secure from inter-

ference by any outside interests now are freely exposed to the covetous gaze and selfish ambitions of the hard-pressed nations of the world, as illustrated by Japanese activities in the Pacific. As long as nations continue to grow in population and material ways, and by such growth create pressure within their own limits, the impelling need for new opportunities elsewhere and the resulting conflicts of economic interests must be prolific sources of trouble. Under such conditions the tendency has been, and presumably must continue, for the strong nation to take what it needs from those unable to hold, as was the case in the Italian seizure of Turkish territory in Africa. Apparently, therefore, the ability to defend what is essential to the life of any nation because more than ever a vital part of its guaranty of existence, with less dependence than before to be placed on natural defences like distance, rivers and mountains.

It might be concluded from all these considerations that the increasing frequency of causes which have led to war will precipitate more and more conflicts, until the whole world is consumed. Such a gloomy future is, of course, not inevitable. Time may develop a more general attitude of national unselfishness toward territorial, racial and economic questions, as a result of which, all these issues may become less acute. However, this is hardly to be expected. The only other hope is in the increasing tendency for nations separately and collectively to prepare themselves in such a way that they can discourage hostile ventures by a covetous or aggressively-inclined people. A powerful league to enforce peace is, therefore, more than an idealist's dream; it seems to be a necessity.

Chicago, May, 1917.

AMERICAN PACKING HOUSES IN SOUTH AMERICA

The great American meat packing companies are gaining the same control of slaughtering and meat packing in South America that they have secured in North America. With their enormous capitol, years of experience, and complete knowledge of the business, they can dominate the business in South America even more readily than they did it in the United States. Already they have enormous packing houses in Buenos Aires, Montevidio and other River Plate cities. Armour and Co. are now building a plant near Sao Paulo, Brazil; it will have a capacity of 7,000 animals a day. South American meat is now extensively sold in the cities of the United States.

THE WEATHER FACTOR IN THE GREAT WAR. VII.* SPRING AND SUMMER, 1917

By Robert De C. Ward
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The Western War Zone

THE battle of the Somme, which began July 1, 1916, came to a practical standstill in November, owing to what was reported to be "an unusually early rainy season, and one of unusual volume as well." As official meteoroligical reports are not available, it is impossible to verify this statement. Bad weather did, however, certainly put a stop to the fighting. The comparative inactivity of the winter began. The Germans were thus saved from making a retreat which would probably otherwise have been necessary in the autumn of 1916. They spent their winter in strengthening their lines in the hope that these would hold through another summer, meanwhile placing more and more reliance upon the results of the submarine campaign which, it was generally believed, would bring England to terms within a comparatively few months. The British and French employed their winter in preparing for a new offensive. A semi-official report was given out that the battle of the Somme would be continued as soon as the weather "broke" in the spring.

The early resumption of the offensive in the spring of 1917 made it inevitable that there would be great difficulty on account of the changeable and stormy spring weather. The rains and mud of Flanders have, from the beginning of trench warfare there, brought extraordinary discomfort and suffering to the troops. The men have had to stand in water over their knees; often up to their waists. Trench stoves and drainage pumps have been in constant use. The wind also, unhindered by any obstruction in that flat and devastated country, has been a serious annoyance. Early in March the Germans began one of their retreats during a cold spell. The ground was hard and dry, and there was a fog. The time was doubtless carefully chosen, so that the thaw which followed, resulting in soft roads and deep mud, should hamper the British pursuit. Several reports mentioned German retreats during fogs. Changeable weather, varying from freezing to thawing, from clear to stormy, is to be expected on the western front in spring. Proper attention to meteorological

*Previous articles in this series have been published as follows: *Popular Science Monthly*, Vol. 85, Dec. 1914, 602-613; this Journal, Vol. 13, Feb., Mar., 1915, 169-171, 209-216; Vol. 14, Nov., 1915, 71-76; June, 1916, 373-384; Vol. 15, Nov., 1916, 79-86; Apr., 1917, 245-251.

conditions often enables an army to take advantage of the favorable spells for its more extended movements. This the Germans seem frequently to have done.

Until well on towards the end of April the weather was most unfavorable for military operations, and interfered very much with the Allied offensive. The British and French troops fought and advanced in spite of all obstacles. "Very wild weather," with an "equinoctial gale" and snow squalls prevailed on March 20-22; the German retreat slowed down in consequence. On April 6, Major Gen. F. B. Maurice, of the British General Staff, said "Our advance under the recent appalling weather conditions must be considered a splendid operation, for the snow there has been as bad as here (England), eight inches having fallen in the space of a few hours." Until after the middle of April the official reports continually mentioned snow, sleet, rain, gales, and cold,—"abominable fighting weather," as one despatch phrased it, with "blinding blizzards of snow." Yet the Allied troops "cheerfully carried out seemingly impossible tasks, although they were soaked and chilled to the marrow" and struggled "after the enemy up to their knees in mud." Finally, after weeks of treacherous spring weather, the last few days of April brought relief. The "brilliancy of the weather was reflected in the faces of the troops." The men sang again. Early in the month the troops were calling for hot drinks. At the end of it, they were fighting thirsty, under burning sunshine, over dry and dusty ground, and were calling for water to quench their thirst. May, June and July brought the usual series of weather types characteristic of the western front at that time of year. There were hot spells when the ground was dusty; when the men serving the guns were stripped to the waist, and when thirst was "the great demon in that shadowless land of craters," where the glaring ground was parched and cracked under the blazing sun. On the day of the Messines battle water was sent forward with two lemons to each man, "to help them through the barrage." The dry weather was not without its advantages, for the marshes no longer offered an impediment to the British advance. Then came cooler spells, after sudden heavy thunderstorms, or during general rains of longer duration which rendered major operations impossible. Major Gen. F. B. Maurice said of the battle of July 31, in Flanders, "the weather conditions were as nearly impossible as could be imagined—low clouds of great density, haze and mist. The observation was almost *nil*, and as a result the artillery was under a severe handicap, having to work without adequate airplane observation." The reports of August 1 mention the rain of

the last few days as "one of the most severe and most persistent experienced in recent summers." The craters, shell pits and new trenches were filled with water; the hardships of the men under shell fire and in the mud were greatly increased; the movement of the big guns was most difficult. A despatch dated Aug. 2 reads: "It is bad for fighting on land and worse for fighting in the air, but fighting goes on." The weather continued wet and stormy until Aug. 4, with little activity. Of the two opposing sides, the Germans had the advantage, for they had better cover, and were nearer their base, so that their supplies had to be brought a shorter distance. The British "tanks" sank deep in the mud, and many times their officers and crews had to get out, under fierce shell and machine gun fire, to "debog" them. Clearing weather (Aug. 5) began to dry up the roads and marshes; made aerial observation possible and the movement of troops easier. A partial German success (despatch Aug. 6) "was due entirely to the heavy fog which prevented the British gunners from seeing the signals which the infantry in the front lines gave, indicating the German advance." Stormy weather, floods and deep mud hampered the Canadian advance against Lens (Aug. 15). The infantry "was wallowing in the mud." "Mists" were on at least one occasion of help to the offensive. In the latter part of August (22nd), during the renewed fighting near Verdun, bad weather interrupted active operations and gave the Germans an opportunity to mass reserves for counter attacks. The last week of August was marked by a pause on all the western fronts, "inevitable after the great successes of the previous week and accentuated," as Major Gen. Maurice said, "by the bad weather which affected the operations all the way from the North Sea to the Italian seacoast."

In connection with the coming of the American troops to France several meteorological items may be mentioned. The heat in mid-July resulted in as much training as possible being done during the cooler hours of the early morning. Plans are already being made for winter clothing, and for heating the dining rooms and reading rooms, it being impossible to heat the various barns, lofts and farmhouses where the troops are quartered. The forest-green uniform for which the American marines in France contended, was selected for use in cold climates. As the marines have usually seen service in the Tropics, these uniforms have been little used.

The Eastern War Zone

Cold and unfavorable winter weather made extended movements impossible during the early spring (March 1-15), and then

came the usual thaws (Apr. 1), followed by the Russian revolution and resulting inactivity on the part of the Russian army. The Germans were doubtless unable to profit by the Russian situation on account of the impracticability of moving artillery and supplies across the marshes. Early in April the Russian War Minister stated, "the melting snows, which render roads and rivers impassable, preclude any big operations." The military head of the Russian Mission to the United States stated (June 23) that the long period of calm on the Russian front was caused "by terrible weather conditions." The weather being "now advantageous for military operations," a new offensive was predicted. During the operations after the middle of July, the Russians are stated to have been obliged to retire near Kalusz because several small streams, swollen by recent heavy rains, had overflowed and turned the lowlands into marshes. The same thing happened in 1916, during Brusiloff's offensive, but then it was the Dniester which overflowed, and hindered his operations. Major Gen. F. B. Maurice said, officially, on July 19: "Bad weather and floods have necessitated the drawing back of some advanced posts."

On May 24, north of Galitch, the Germans used gas, but a change of wind drove it back into their own trenches.

The Italian War Zone

Until about the end of March, the winter storms and deep snows prevented any large-scale operations. Snow tunnels were several times used in making surprise attacks. Snow storms, and "thick mists" and heavy rains, were taken advantage of as a means of concealment during advances. Early in April an Austrian general was killed by an avalanche during an inspection tour. "Bad weather" frequently hampered operations throughout the spring. Snow (until the middle of April), "blizzards," heavy rains and swollen rivers are noted in the despatches. The time for the main Italian attack about the middle of May seems to have been chosen between floods on the Isonzo River. The troops were able to cross on pontoons. Usually, at this season, the river is practically impassable except on fixed bridges. It is a time when the spring rains and the melting snows in the Carnic Alps cause the rivers to flood. The passage of the Isonzo was forced in a heavy fog. Italy's strong spring offensive on the Carso plateau could not be begun earlier on account of "terrible atmospheric conditions." Great difficulty was experienced because of lack of water on this dry plateau. Each day, according to one despatch, 450,000 qts. of drinking water were carried up for the thirsty men. Thunderstorms and occasional rains brought tem-

porary relief, both in supplying water and in limiting military activities. Early in July (10th), the Austrians began a night attack, on the Vodice, in a violent thunderstorm. In the darkness the enemy had almost reached the Italian positions when a sudden flash of lightning revealed the attacking party, which was completely repulsed. "Stifling heat" was reported late in August on the Carso plateau, but the Italian advance continued. It is worthy of note that the southern soldiers of Gen. Cadorna's army were especially mentioned for their valor and fighting abilities during the conquest of Monte Santo.

(Concluded in November)

MINERAL WEALTH OF SOUTH AMERICA—PAST AND PRESENT

By F. E. Williams
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Introduction

Doubtless mining was the first industry to give impetus to settlement in South America by Europeans. The presence of minerals had more or less influence on the native Indian people, early exploration, Spanish and Portuguese colonial policies, and the later national development of the South American republics. No attempt will here be made to discuss the origin or distribution of minerals. It is the purpose of this paper to point out some of the results brought about by the discovery and exploitation of rich mines in South America.

The Incas and Minerals

The great Inca empire was founded at least two hundred and fifty or three hundred years before the conquest of Peru by Spain (1532). Although these people were great agriculturists, they were also skilled in working the placer deposits for precious metals. Gold was used for ornaments, utensils, decorations in places of worship, and statues. The temples of the sun-god reflected the brilliancy of gold, silver, and precious stones. Silver-lead ores were smelted, and copper tools were in common use. Indeed they valued the copper more highly than either the gold or silver because of its greater usefulness. The amount of gold and silver collected by these peoples was extremely large, although probably overestimated. Such treasures probably represented centuries of accumulation. However, labor was cheap and hence the cost of production was small.

What effect the use of decorative minerals had on the artistic temperament of the Incas can only be conjectured. Perhaps decorative minerals stimulated them to the production of the fine structures whose remains are so abundant. Whatever the beneficial effect of this wealth on the Incas, we are certain that its presence proved their undoing. The gold and other precious minerals which had been gathered by the Incas spurred the adventurer on to hazardous deeds and led him to perpetrate monstrous cruelties which eventually not only destroyed the Inca empire, but broke the spirit and endeavor of a remarkable race.

Exploration and Conquest

No sooner had Columbus established a colony in the West Indies than the search for gold and silver began. This search led the Spaniards from island to island; from the islands to Mexico, to the isthmus of Darien, and to the continent of South America. A great number of well known explorers and conquerors touched or crossed portions of the South American continent. Such names as Balboa, Pizarro, Mendoza, Von Hutten, Valdivia, and Raleigh are known to most readers. Doubtless there are some explorers who were not seeking previous metals but the number was probably small.

It seems clear that most of the discoveries and conquests of South America are directly related to the influence of minerals. In nearly every case was the adventurer spurred on by the possible discovery of a new region of wealth not yet raided by one of his countrymen. And a large percentage of them found gold. Otherwise the incentive would not have remained so strong.

Settlement and Colonization

No sooner had the gold washings of Hayti been discovered by the followers of Columbus than the government of Spain took immediate steps to exclude other nations from the newly discovered regions. Thus the Spanish government maintained almost exclusive control over southern North America and most of South America.

Mining was carried on chiefly by enforced labor and hence the cost of production was slight. The life of the Indian miner was considered of little consequence by the European and the loss of an Indian meant to the mine overseer only a relatively smaller amount of gold produced. So long as Indians were plentiful this caused little concern. In 1573 there were available for the Potosi mines eleven thousand laborers; one hundred years later there could be found but sixteen hundred. Through such a system of enforced labor the ordinarily inaccessible regions

could be worked at a profit. The great number of abandoned mines reaching from the isthmus to Potosi show that mining was widespread.

Even in Chile, which was considered poor in minerals by the Europeans, the natives were made to work in the mines. Some of them rebelled and the unconquered Araucanians were a constant menace to the Spaniards so long as they held the colony in Chile.

According to the ideas generally accepted at the time of South American settlement, gold, silver, and other valuable minerals alone constituted the wealth of a colony. Hence we find the Spaniards fixing their attention on the precious metals regardless of other products.

Since Peru had the greatest wealth and the most perfect form of native government, it seemed natural to the Spaniard that it should be made the center of Spanish authority in South America regardless of the inconvenience of its situation and topography. Consequently the region around the Plata was late in developing for everything had to pass in or out via Peru and Panama. The Spanish government did not fear that they would lose seriously because of evaded duty on agricultural or pastoral products, but they were suspicious that outbound packages might have gold or silver secreted therein. But trade will follow the natural and easiest path and the result was much smuggling and a growing disrespect for authority which was later disastrous to Spain. So detrimental was this long, indirect route, that the first real settlements in Argentina came in from the west as a sort of overflow from Chile. It is clear, then, that in the case of Argentin, which was relatively poor in minerals, the policy of Spain was a serious drawback. The only compensating influence was that a few valleys of northwestern Argentina developed because they could raise provisions for the mining communities in the neighboring plateaus and mountains to the west.

The Plata regions were not the only agricultural communities to suffer. The Spanish authorities seemed determined that South America should produce nothing but gold and silver. Everything was subject to strict and often harmful regulation with the result that very early the fruitful fields and the viaducts which made irrigation possible were neglected. The laws were so formed that only mine exploitation was protected, and gold and silver were shipped in exchange for commodities from Spain. Another cause of agricultural decay was the enormous toll of Indian life taken to keep up and increase the mine operations. Under such supervision it is little wonder that the agricultural conditions steadily grew worse instead of improving.

The amount of gold obtained in the colonial period can only be estimated and often the bases for computation are rather unreliable. All writers agree that it was enormous. Mining of gold, silver, and quicksilver was carried on constantly by the viceroys of Spain. The quicksilver of Huancavelica was of great importance. This locality maintained for a considerable period an average of 670 tons per annum. The presence of the quicksilver was the only thing that permitted the extensive treatment of gold and silver throughout the Andean region. During the two hundred and nineteen years from 1570 to 1789 this mine is said to have produced $67,629,396 worth of mercury. The mines of Colombia produced upwards of $30,000,000 in colonial times. In the first ninety years the mines of Potosi alone produced $395,619,000 and between 1545 and 1800 the king's fifth from the output of these mines was $163,000,000. On this assumption the output of the mines for the above named period was $815,000,000. One writer says (an estimate based on fragmentary evidence) that in the two hundred forty-eight years up to 1740 Spain received from all possessions of America $9,000,000,000.

This "precious metal" policy of the Spaniards not only retarded progress, but in many cases caused an actual deterioration. The immense products obtained from the mines of South America in the sixteenth, seventeenth, and eighteenth centuries had many evil effects on the Spanish colonies. In the rich mineral producing colonies the most direct effect was to enrich a few without personal effort and to weaken the reliance of the colonies upon agriculture. The abundance of precious minerals on the South American continent was responsible for its colonies having a less substantial development than those of North America. "In the long run, the fabulous wealth of Mexican and Peruvian mines proved of less account than the corn-lands and the forests and iron mines of North America." *

The influence of minerals on the Portuguese colony of Brazil was less marked but is worthy of mention. The quest for precious metals was probably incited by Indian legends. As early as 1600 the Paulistas began this search, which was continued for many years in connection with slave hunting. The Portuguese found gold near the close of the seventeenth century and diamonds in the early part of the eighteenth, both in the province of Minas Geraes. Perhaps the greatest productiveness of the gold was from 1752 to 1761, when the annual yield was six million dollars. Brazil was the leading producer of diamonds until the opening of the South African fields. Perhaps the best estimate

* Enock, C. Reginald. The Republics of South and Central America, 1913, p. 25.

of the total output of diamonds from 1729 to 1885 lies between sixty million and one hundred million dollars. There were several rushes to the gold and diamond fields; there were disturbances and even rebellions because of the harsh mining laws; but the influence of minerals in Brazil was much less far-reaching in its effects than in most of the Andean colonies.

Fortunately for the natives of Brazil the discovery of gold came much later at a more humane period than that of the conquest in western South America. Furthermore, Indians were harder to obtain in Brazil, and Negro slaves were taken from the plantations, already short of labor, to work in the mines of Minas Geraes.

National Development

During the period of revolt against the Spanish crown and for some time afterward, mining suffered a decline in nearly all parts of South America. This was due in part to the political disorder, violent for a time and spasmodic for a large part of the nineteenth century, and in part to the restrictive mining laws. The latter part of the nineteenth century and the first part of the twentieth have been marked by new and better mining codes and more stable governmental conditions so that there has been a revival in mineral production.

At the present time the output of gold from South America, the once famous El Dorado, is the least of all the continents. It still holds next to the highest place in the output of silver, but it is only a distant second to North America. The total output of all minerals of the South American continent is of relatively small value; although among the countries of the world, Chile ranks first in nitrate and sixth in copper; Brazil, first in monazite sand (much used for gas mantles), second in diamonds, and third in manganese; Peru, third or fourth in silver and ninth in copper and petroleum (1/250 of the output of the United States); Colombia, second in platinum, but is far behind Russia; Bolivia, high in silver, first in lode tin, and one of the first three in total production of that metal; and Venezuela one of the leading producers of asphalt.

If we consider the two great fundamental minerals of most economic consequence, coal and iron, we find that in the whole of South America the latter is barely mentioned as actively mined, and the former is about 1/800 of the world's output, nearly all from Chile. There are, however, high grade iron ore reserves in Brazil estimated at over two billion tons and the province of Minas Geraes will no doubt be one of the important world sources of iron ore in the near future.

Of more interest to us in this discussion is the relation of mineral output to the other products of South American countries. In Argentina, Paraguay, and Uruguay minerals are of little consequence at present and have played practically no part in the national development. The Guianas are dependencies and mining occupies the attention of but a small number. Ecuador, Venezuela, Colombia, and Brazil have depended somewhat upon minerals and their present output, at least of the last three, forms a fair portion of their resources. Of Venezuela's exports, asphalt and copper are important. Colombia's relative production is somewhat smaller, while Brazil's total mineral production is but a small fraction of her total exports. The three remaining countries, Bolivia, Chile, and Peru, have been much more influenced by minerals. In 1906 Peru's mineral products were nearly one-fifth of her total exports, while in 1910 they were over one-fourth. Bolivia's most important export is tin. Her export of tin in 1909 was about one-half of all exports and in 1913 was over two-thirds. Second place in exports is held by rubber, but third, fourth, and fifth places are given to silver, copper, and bismuth. Chile's exports in 1910 were almost five-sixths minerals and continued in about the same proportion up to 1916; most of this was nitrate, which was in 1911 second to coffee in value among exports of the continent. Of the eighteen most important ports on the west coast ten are exporting ports and eight of these are in the nitrate group. Such a large production of minerals in Bolivia, Chile, and Peru could not help affecting the economic and political conditions in these countries. It was the value of the nitrate deposits that caused the war of 1879 in which Bolivia, Chile, and Peru were involved. Indeed the presence of minerals practically controls the distribution of population in the high plateaus and valleys of the Andes.

In the future new fields of mining enterprise may be developed. Large treasure will doubtless be taken from the mountains for centuries to come. The fact that large amounts were produced in the past by an enforced labor system does not necessarily mean a renewal under modern conditions. There are over 10,000 abandoned silver workings in Bolivia. Doubtless a large percentage were abandoned on account of labor conditions. Certainly the nitrate will continue to dominate Chile as long as the demand remains and the supply holds out. Tin and other minerals will be of great importance in Bolivia, and copper and silver will have an important share in the exports of Peru. Of the other countries Brazil will probably reap more benefits from minerals because of its vast reserve of iron ore. The lack of coal is a serious drawback throughout South America and under present

conditions it can only be partially compensated for by water-power. Improved methods of transporting and applying electricity may at some future time very largely supply the deficiency of coal. Coal is now the greatest of all imports in tonnage and controls to some extent the trade in other products. Most South American countries have passed the stage where the precious metals are the most important factors and in the future the agricultural and pastoral industries will engender more substantial progress even in the Andean countries.

Summary

The Incas accumulated a large amount of precious metals which to them were of use for utensils and ornaments, but were not of so great usefulness nor valued so highly as copper. The presence of these accumulated metals and of the mines already worked, together with the newly discovered deposits, led a number of adventurers to undertake hazardous expeditions, to inflict some of the worst cruelties known to history; it caused Spain to adopt a policy of exploitation which although fruitful to the home country at the time, was harmful to the colonies and in the end disastrous to the Spanish nation. Brazil has benefited by mining and will further develop her enormous mineral resources in the future. The other countries east of the Andes have produced but few minerals and have prospects of but little mining development. But the Andean countries have been much influenced as nations and will have their policies modified in the future to a greater or less extent by mineral output; especially is this true of Peru, Bolivia, and Chile.

SOME POINTS ON THE PREPARATION OF GEOGRAPHIC TEACHING MATERIAL

By H. D. Grose
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1: Preparation of Maps for Desk Use

THE fate of contour and other maps used for desk study by pupils under ordinary conditions is all too well known. Such maps speedily become soiled by finger prints and dust films; they are also liable to defacement by pencil marks, ink blots, and other marks, accidental and non-accidental. The most careful supervision usually fails to prevent this, particularly in large laboratory sections. More especially is this the case when the map serves as the basis for a written report. Pupils have an instinctive tendency, in making their study, to locate points of

reference with a pencil or pen. Many repetitions of this process render such points of reference very easy for succeeding students to find, but lend neither beauty nor teaching value to the map. An inked pen point leaves a mark not to be mistaken, even by the most innocent.

Several devices for the prevention of this result have been proposed. Plate-glass desk-tops, under which the map may be placed for study, have been used with good results. Frames, similar to picture frames, with glass or sheet celluloid cover-plates, are also in use. Transparent tissue, pasted over the face of the map with colorless mucilage, serves the purpose fairly well; it is easily removed by dampening when soiled. When classes are few and small, unprotected maps, provided with check-marks, may be assigned to individual students, with assessment of fines for defacement. But glass is rather expensive and is liable to breakage. Celluloid is expensive and easily scratched. Frames are clumsy and noisy to handle; the frequent changing of maps entails much unnecessary labor. The fine system is conducive to ill-feeling and evasions of honor. Meanwhile the unprotected map goes its merry way slowly but surely to defacement and the scrap-heap.

It is a common and valuable practice to prepare maps for class-room service by backing them with muslin. This is a time-consuming and costly operation which cannot be often repeated when, as is usually the case, the appropriation for equipment is small. The common result is the prolonged use of maps which, from much handling, are both unsightly and unsanitary.

Coating Maps With White Shellac

A simple device obviates all of these difficulties. While the maps are still upon the mounting-board, and after they have become bone-dry, they may be varnished with a light coat of white shellac. The varnish should be thin enough to spread readily without showing brush streaks. With a soft brush of moderate width this operation may be quickly and easily performed. If profile lines or other reference marks are desired upon the maps, they should be located before the varnish is applied.

The varnish coat is quite resistant to abrasion by pen and pencil point. It does not take pencil marks readily. It is water proof and thus prevents ink blots from reaching the map face. When the varnished map becomes soiled it may be quickly restored to cleanliness by means of a soft dampened cloth or sponge.

Ordinary varnishes are not advisable for this purpose, as

they are too liable to crackling, which renders the map illegible. Moreover, they dry slowly, and tend to penetrate the body of the paper, causing an untidy appearance through streaking. Most disagreeable of all, they darken rapidly, adding to the difficulty of reading the map. Thin, white shellac varnish is free from all of these objections.

The teacher who has the wholesome penchant for making wall maps, graphs, and diagrams, will find the above an efficient means of greatly prolonging their usefulness. In the final trimming of cloth backed maps, it will be found that rounding the corners with the shears or a die will add to the appearance of the map and will in large measure prevent the tendency of the map to strip from the cloth backing.

2: Enlarged Maps

In the introductory work with contour maps, it is frequently desirable to have for general discussion a large wall copy of the map upon which the study is based. So far as the writer is aware, such maps are not published; and they would probably be too expensive for general use if commercially available. Where photographic apparatus and a stereopticon are at hand, they may be easily made as follows:

(a) Prepare a process-plate of the desired map.

(b) Project this with the stereopticon upon bromide paper and develop in the usual way as per directions which accompany each package of paper.

(c) Mount the bromide enlargement in the manner customarily employed in mounting maps.

In practice, it is usually inconvenient, with the equipment ordinarily available, to secure a satisfactory enlargement of an entire contour map at one operation. It is better to prepare four or more negatives, each covering a corresponding fraction of the map. This will insure greater sharpness throughout the whole finished map, and obviate the difficulties encountered in manipulating large sheets of photographic paper. Needless to say, the several negatives should be of uniform density and size—conditions which the photographer of ordinary skill will easily know how to secure. If regular bromide enlarging apparatus is available, the results will be none the less satisfactory. Trays large enough for the manipulation of photographic paper of suitable size are generally not at hand. They may be easily provided by constructing a wooden tray of suitable depth—three or four inches—and appropriate length and width, lining the same with cheap white oil-cloth. A still better practice is to construct a tray with tight joints and paint it, both inside and out, with two

or three coats of hot paraffine, heavy shellac varnish, or better still, with the "tray enamel" to be secured from the larger photographic supply houses. Care should be taken to fill all cracks and joints thoroughly with the coating material.

By the photographic process above described, enlarged detail sections may be prepared, to facilitate the presentation of particular problems involved in the study of the map. Such enlargements of harbor maps, of mountain passes and other physiographic details playing so important a part in the control of human activities, are of especial value in commercial geography and history classes when the stereopticon is not available, or when it is desirable to have such material for some time on display for students' individual study.

3: Lantern Slides

The use of lantern slides is so well known that it would seem unnecessary to more than point out the value of adding to the collection a series of prints from the negatives prepared for the above purposes. But the recent perfection of inexpensive high power incandescent lamps for the stereopticon, utilizing the ordinary lamp service, has almost revolutionized the use of the lantern in the class room. With this equipment available, the stereopticon need no longer be the thing of occasional use when time can be found or made especially for that purpose, but the desk stereopticon becomes the ever-ready means of instantly illuminating the subject under discussion. With the slides at hand, a turn of the switch button throws the illustration on the screen the moment it is needed. The slide no longer remains a teaching luxury, it becomes a teaching staple of increased value because of its ready availability. Hence the addition of such slides as indicated above is all the more desirable. Diagram slides of great variety and value may be easily prepared by tracing the desired figures with a fine pen and India ink upon glass plates of lantern-slide size. The method has been described in full in a previous number of the Journal of Geography.* To facilitate the use and increase the value of the slide collection, a systematized storage plan is all essential. From the standpoint of flexibility and accessibility none better than the box unit system has as yet appeared.†

4: Duplication of Special Material for Student's Use

There are many maps, diagrams, and pictures whose teach-

* Vol. VIII, pp. 135-136.

† William Herbert Hobbs: The Use of Lantern Views with Science Lectures, Journal of Geography, Vol. VII, pp. 180-186.

ing value would be very great if only they were readily available. Unfortunately, such material is too often buried in bulky reports or in books not readily accessible when needed. The obvious means of utilizing it is the preparation of a lantern slide copy of the desired figure.

It is occasionally highly desirable to provide each student with a copy of some particular graphic material. Such copies, of desirable size, may be prepared in any number, as per the suggestion at 2 above, from the process plate negative from which the slide is made. For the sake of rapid and convenient printing, the preparation of a 5 x 7, or larger, process-plate negative will be advantageous, since in producing a large series of prints the direct printing process is far speedier than the projection method. Any of the several developing papers now on the market will be found convenient for this purpose. The use of a matt surface paper will permit the coloring of maps thus prepared with either crayon or water color.

5: Preparation of Outline Base Maps

While there are several series of such maps commercially available, they are rather expensive in proportion to their value, they are often of unsuitable size, and frequently the desired base map is absent from the series. There are two good methods of producing such maps on a large scale: (1) by means of the hectograph, (2) by means of the mimeograph. The former apparatus is described below. The latter is now so commonly a part of the office equipment of the school, and its use is so simple and satisfactory, both as to quantity and quality of results, that it should be preferred whenever available. The procedure is as follows:

(a) Lay the blank stencil upon the map whose reproduction is desired, securing it in place by means of thumb-tacks, paper clips, or other device to insure permanent register.

(b) Trace in the outline with the stylus in accordance with the directions provided with that instrument.

A little practice will enable the production of highly satisfactory maps and diagrams by this method. Once the stencil has been prepared, as many copies as needed may be made. The recently introduced Dermatype stencil is especially suitable for this purpose, since it may be cleaned and filed away for future use after the first run has been secured, thus making the production of outline maps by this method very inexpensive indeed.

In tracing the outlines upon the stencil, it will be found help-

ful to work by transmitted light, particularly when working with the Dermatype stencil which, unfortunately, is at present a tinted product, a serious disadvantage in tracing from colored maps. Several devices for securing transmitted light will suggest themselves. A convenient one is an inclined frame similar to the retouching rack, but larger. The design of this may be secured by a visit to a local photographic studio. Perhaps the simplest and least expensive to prepare consists of a good-sized box, open at the top, with an incandescent electric light bulb inside. Lay a sheet of ground glass over the opening, place the map and stencil upon the glass, switch on the light, and the apparatus is ready for use. In the absence of ground glass a sheet of white tissue paper pasted upon the under side of a sheet of plain glass will be found a good substitute. Incidentally, the above device makes an admirable printing machine for gas light photographic paper.

6: Preparation of the Hectograph

Where the mimeograph is unavailable, the hectograph may be used to good advantage. There are many forms of this device upon the market, usually at prices too high in proportion to value received. The hectograph is not difficult of construction, and may be made in any size desired by the user.

Hectographs are of two general types, kaolin and gelatine. Either type is good. The latter is somewhat more satisfactory, though less easily prepared. The *modus operandi* is as follows:

(a) *Kaolin Hectograph.* Into a tray of suitable size place enough dry white kaolin to fill tray to a uniform depth of about three-fourths of an inch. Add glycerine and thoroughly incorporate until kaolin is free from lumps and is of the consistency of very stiff putty. Level off smoothly, and the apparatus is ready for use as described at c below.

Kaolin may usually be secured from the larger dealers in artists' supplies; it should cost about fifteen cents a pound. It is advisable to purchase in five-pound lots for the sake of economy in price and because of the necessity of an occasional addition to the tray to make up for losses in washing off old copy. Should the kaolin become too dry, thus reducing the number of copies obtainable, add glycerine and rework to the original consistency.

A tray 10 x 12 x 1 inches will be found convenient; it should be provided with a snugly fitting cover. The local tin-smith will be able to make such a tray at a reasonable rate.

A satisfactory levelling device is made of hardwood in the form of a T-stick, the cross arm being cylindrical with rounded ends; it should be slightly shorter than the width of the tray.

After the kaolin surface has been smoothed as well as possible by hand, lay upon it a piece of medium weight hard paper and with the T-stick rub it down to absolute smoothness. The printing bed should be relevelled in like manner after each using.

When the kaolin tray is not in use, it should be covered with a thick cloth of white, non-linting goods, dampened in glycerine. The tray should be stored upside down, to prevent evaporation of glycerine.

(b) *Gelatine Hectograph.* Formulae for the gelatine hectograph are numerous, and may be found in any of several books of formulae at the public library. Pure gelatine, which is usually demanded by them, may be secured from the druggist at varying prices, usually high. A very good formula of this type was published in a recent number of the *Journal of Geography.* * Another good one is as follows:

White Gelatine (or white glue)	4 ounces
Glycerine	16 fluid ounces
Rainwater	10 fluid ounces
Carbolic Acid	a few drops

Put all together in a granite vessel and soak twelve hours or more; melt over a slow fire or in a double-boiler. When thoroughly melted, pour into a shallow metal tray (see a preceding paragraph; the present formula is designed for the tray there described); skim off bubbles with a knife or card edge, set level until cool. It is then ready for use. If the printing bed is too soft, remelt and evaporate some of the water; if too hard, causing the surface to peel or crack when in use, remelt and add a little water.

(c) *Use of the Hectograph.* The method of using the Hectograph involves the following steps:

1. Prepare the desired copy upon hard writing paper, using hectograph ink or copying pencil, and uniform pressure in tracing.
2. Wash the face of the Hectograph with a soft sponge and tepid water, applying liberally and immediately draining.
3. Soak up surplus moisture with soft absorbent paper until printing face appears dry. Newspaper is excellent for this purpose.
4. Place copy face down upon printing face, rub into thorough contact, and allow to remain five minutes or longer, depending upon number of copies desired; then remove.

* Vol. 14 (January, 1916), p. 143.

5. Quickly rub into contact with hectograph face a sheet of blank paper; remove, and repeat until the desired number of copies is obtained.
6. Wash hectograph face immediately after use with tepid water to remove all traces of old copy; it is then ready for new copy or for storage.

With the gelatine type, it is not necessary to remove old copy by washing if some time is to elapse before next use, as the ink will in time sink into the body of the hectograph. Washing is to be preferred however.

Hectograph ink may be secured from the stationer's shop, and gives the maximum number of copies, often as high as sixty or more satisfactory duplicates. Copying pencil is easier to use and usually suffices where not more than twenty copies are needed. If desired, typewritten material may be reproduced by the hectograph; the original copy should be made with the copying ribbon or with the copying-carbon paper. The latter is, if anything, even better than the ribbon for this purpose. The possessor of the Hectograph will find a host of applications for this useful device—indeed, its uses are almost without limit in variety.

All of the above suggestions have been utilized by the writer to advantage, and are passed on with the hope that they may prove equally helpful to his fellows in the profession.

A PHILIPPINE FIESTA

By Hadwen Harry Williams
Bureau of Education, Manila, P. I.

EVERY Philippine town has annually a celebration or fiesta in honor of its patron saint, when people come from all the nearby towns to see the processions, watch the open-air theatre and enjoy the merrymaking. It is the most important holiday of the year, and no Filipino will miss a town fiesta if he can possibly help it.

For some reason the little village of Bambang up in the mountains of Northern Luzon had not had a fiesta since 1898, but lately there was one almost grand enough to make up for the eighteen years. There were to be so many events of interest that it would last for two days, so one Monday morning we sent our baggage to Bambang on packhorses, and followed on horseback when the sun had dropped behind the mountains and the air was cool. Everyone seemed to be going to the fiesta, some on foot, some

in ox-carts, and some riding horses of carabaos. With food, extra clothes and blankets, they were prepared to stay till the end of the events.

From the church was flying the papal flag of white and yellow; from the bamboo stage erected in the plaza fluttered the Stars and Stripes near the Belgian flag, the latter indicative of the Belgian priests who work in this province, Nueva Vizcaya. The plaza was full of people listening to the music of the two competing bands from neighboring towns. Boys in clean white drill suits talked with gaily dressed senoritas, while their parents conversed about the rice and tobacco crops. At the cockpit a noisy crowd were betting on two roosters, while along the streets vendors were selling rice-cakes and all kinds of sweets. The days of cockfighting are numbered, for the Filipinos have found baseball to be more interesting and not so hard on the pocketbook.

The first number on the stage was an imitation battle between two groups of the non-Christians. These are the wild people who live far back in the mountains and are the least civilized of any of the people in Uncle Sam's island possessions. After a promise of beads and brass wire for anklets, they had agreed to attend the fiesta and appear on the program. Gaudily decorated with anklets, bracelets, beads, white horsehair and red cloth, their nearly naked bodies appeared to be as well developed as those of many athletes. To the beating of a crude drum they fought with spears and shields, with bows and arrows, though of course no one was injured; and then followed some of their dances. While a big brass gong was sounded, a man and woman gave the marriage dance; then followed the victory dance, which was accompanied by much shouting and brandishing of spears. It was hard to realize that this was not merely a show, but that these people were doing just as they so often do in their rancherias in the mountains.

Then followed a comedy given by some of the people of Bambang in the Isinay language; for though English is the official language and is used in the schools, many of the older people do not understand it, and it is not yet the language of the stage or the church. The crowd stood on the ground in front of the stage, and interestedly watched the lovemaking of the actors who stood under a bower of palm branches and banana leaves, illuminated by the light from Chinese lanterns. At intervals there was music by the band, and when the spectators became tired, they sat on the brick wall of the patio. The wall, church, and bell-tower are in an excellent state of preservation, though they were built by the Spaniards in 1786.

After the performance there was a dance in the largest

house in town, for the Filipinos are fond of dancing, even if this is a tropical country. The first dance is always the stately Spanish rigadon, a gay scene with many trailing gowns and polite bows. But one must get some sleep if one is to enjoy the fiesta the next day, and far into the night orchestras could be heard as they went about the town serenading town officials and popular young ladies.

There were more imitation battles given by other tribes of the non-Christians, but this time the stage was too small, and in the shade of a little structure erected by the priest for his American and Belgian friends, we watched the fighting on the plaza. To give it the effect of a pageant, a Spaniard with an air rifle and some men with spears came and appeared to kill or capture all the wild people. Then they came up before the provincial officials, laid their weapons on the grass and gave a loud cheer. They were now through with their part of the program and were given their reward of beads and wire.

It is customary at a fiesta to have the "Moro-Moro." This play is given on the stage and represents at great length the capture by the Spaniards of the Islands in early times. Sometimes it is given three hours every night for a week. It is always given in the local dialect and most Americans can only guess at what is going on among the actors. There are plenty of thrills and sword-fighting; finally, after a beautiful princess is captured and recaptured, the Spaniards take possession of the Islands in the name of the King of Spain. It has been played for years in nearly every village in the Philippines.

At two in the afternoon, the padre had a banquet for his guests in the *convento*, his residence near the church. Outside the open-air play went on, with the people cheering and the band playing, and a blinding sun beating down on hundreds of opened umbrellas, which the people always carry, as either sun or rain is likely to be unpleasant.

In the evening there was a representation of the discovery of America, with Columbus, the Indians, and a boat. This was the closing number, and when it was finished our servants were waiting with the horses, ready for us to start back to the provincial capital. The fiesta for Santa Catalina de Sena had been a great success and now will probably be repeated every year.

TWO INDUSTRIES OF MADAGASCAR

Two interesting industries have been developed in Madagascar, The Great African Island which is only two hundred fifty miles off the southeast coast of Africa. One of these is the silk

industry. The Halabe is a silk producing spider which is indigenous to the island. These spiders have an unfortunate habit of devouring each other when hungry, and consequently they multiply only in places where there is sufficient food. The process of reeling the silk from the spider is a peculiar one. From twelve to twenty-four spiders are placed in a frame with a special compartment for each one. The operators touch each spider and the thread of silk, which becomes attached to the finger when it is withdrawn, is carried with the threads from the other spiders to a hook that joins the threads into a single one. This thread is later wound on a bobbin. Care must be taken not to injure the spiders because they can be subjected to four or five reelings, which represents about four thousands yards of thread. When this process is finished, the spiders are placed in a "park" made of bamboo planted in the ground and connected by strings so as to make a trellis. In a few days' time those that have not been eaten up are put through the same process again. The silk of the Halabe spider has a pure, brilliant yellow color and is very elastic and tenacious, qualities which make it superior to ordinary silk.

The other industry is that connected with the rafia palm. This palm grows everywhere along the coast and does not require cultivation and attention. It grows to a very large size, each branch being almost a tree in itself. The ribs in each branch are usually twenty feet long and contain a light pith which, when split up into layers, is very light and strong. The natives use it for ladders, shafts, and various other things. Each branch of the palm produces from eighty to one hundred green leaves from two to five feet long. The under part of the leaf has a pale green color and can be pealed off much the same as the skin on a pea pod. When dried in the sun, it becomes a light straw color. This is what is called rafia. The natives originally used it for clothing, but now the gardeners and nurserymen use it for tying up vines and for grafting. The supply seems to be inexhaustible and is limited only by the supply of labor.

BLANCHE McCARTHY.

FIRES IN CHINESE CITIES

When a fire starts in a Chinese city, it is difficult to confine it to a single house; and if no more than a score of families are burned out, the neighborhood is fortunate. At least this is true in South China. The houses are built of lath and plaster on a wooden frame, and roofed with tiles which are thin and brittle.

The larger houses have some or all of the walls of brick or adobe, and they may escape; but where one wall, either of mud or of lath and plaster, serves for two adjacent houses, the chances of escape are not many.

It is an interesting sight to see a fire company going to a fire; but it lacks the thrill of the gallopping horses and dashing engines which we are accustomed to in the United States. In place of the horses, and the men in waterproof attire, a company may consist of fifteen or twenty men walking at little more than ordinary gait, and dressed in cotton clothes, with waterproof hats of bamboo, and with feet bare. In place of the smoking engine and the long hook-and-ladder truck, there are wooden clubs, hooks, and banners: the clubs and hooks are for use in tearing down adjacent houses so that the fire will die from lack of nourishment; the banners are to show what fire company it is. And in place of the clanging bells of the engine or hose cart, one man in each company carries a brass gong which he pounds. In the larger cities where western influences are being felt, there are a few force pumps which are dragged or carried by men and worked by hand power. To these are attached lines of hose which furnish a small stream and can be used as high as the roofs of the single story (or occasional story-and-a-half) buildings, if the nozzle can be carried to within twenty or thirty feet of the point where the water is needed.

There is little danger of a fire spreading by the falling of burning brands upon the roofs, and the houses may be gutted before spectators on the hill see any sign of its being on fire. But suddenly the shell cracks, and the roof falls crashing to the ground. Thus house after house becomes a prey to the flames until (if there is no wind) some house may have been so thoroughly soaked by water that it checks the fire; or until a space is reached where the houses have been completely demolished by a fire company; or until it reaches a fire wall. Fire walls are of brick or adobe, a foot or eighteen inches thick, and extend above the roofs of the houses; they have openings only where they cross the streets, and these frequently have sliding doors of sheet iron which may be closed in case of fire. Such walls are built in both directions through the city, at distances of 200-300 feet from each other, and are built expressly for this purpose of checking fires.

Fire ordinances and regulations seem unknown. Insurance rates of course are high, but advantage is often taken of a fire in the neighborhood to burn one's own house for the sake of the insurance; during a recent fire in Foochow, fires broke out in no less than twenty places in the vicinity before the flames from the

original fire had actually spread that far. Perhaps the nearest approach to any regulations is the custom which demands that the owner of the property where the fire started cannot rebuild until all others whose property was destroyed have done so; and all the debris caused by the fire is dumped on the spot where the fire started. The owner of this property must see broken tile, stone, and other useless rubbish piled hill-high on his land from all the other devastated property before he can clean up and rebuild. Everything which can possibly be used will have been removed, even while the flames were at work: smouldering and charred timbers are carried away to be used for fuel, if for nothing more valuable, and the ruins and debris are raked and picked over for everything of the least value that flames could not destroy, even to the rusty nails.

WALTER N. LACY, Foochow, China.

GERMANY'S PROJECT OF EASTERN EMPIRE

FORTUNATELY or unfortunately, depending on your point of view, Germany's development as a great power came late in the world history. The colonial spoils of the world had been divided among older nations when the empire was born in 1871. Consequently Germany had to be content with what she had, or win by armed conquests the dominions of other nations at home or abroad. Within a few years of its birth, the German empire had bounded in a few record-breaking leaps from a quiet community devoted principally to agricultural pursuits to an industrial and commercial power. Without this transition the magnificent plans of Germany's architects of fortune could never have been realized even to the measure now accomplished. The launching of Germany on her career of industrial and commercial success, her era of wealth production, may be said to mark the real starting point of her race for world dominion.

The German policy of creating a Middle Europe under the sway of the Hohenzollerns (so naively explained by our government a few weeks ago and published in the press throughout the country as if it were a new discovery of German political aims) was born in the minds of Germany's ruler and his closest associates years ago.

By her alliance with Austria-Hungary, Germany has practically dominated the political destinies of the dual monarchy of late years. By dynastic manouvers she attempted and partly succeeded in securing the virtual vassalage of some of the Balkan states. Serbia alone was irreconcilable, a weak Slav power, but

belligerently opposed to Teutonic advances. Bulgaria was secured through the agency of a German Prince on the throne at Sofia. Rumania likewise was supplied with a German ruler of the house of Hohenzollern. The Greek monarch of the present Danish house, originally German, was wedded to a sister of the Kaiser,

and German officers tutored and influenced Turkish troops armed with German rifles and Krupp cannons. The Kaiser's courtship in Constantinople began when he ascended the throne. On November 8, 1898, Emperor William speaking in Damascus addressed the following honeyed words not only to the Turks, but to the followers of the Prophet in Egypt, India and China:

"May His Majesty, the Sultan, as well as the three hundred million Mussulmans who venerate him as their Khalifa, be assured that the German Emperor is their friend forever."

About a year later, Germany had secured her first concession for the Bagdad railway, the proposed road of steel over which the German empire was to be projected to the Persian Gulf.

The right of way was practically clear. There was first of all Austria-Hungary, by its very nature an artificial state composed of half a score of mutually jealous nations, held together by a single individual, Emperor Franz Joseph, a crumbling old man. Political prophets foretold the collapse of the Dual Monarchy with the aged ruler's death. The Balkans were occupied by Slav and Latin races, hating one another, and always ready for a fight. The Turks, a noble race originally, were gradually decaying under the blight of Mohammedanism.

German university professors, German political leaders, the spokesmen of Pan-Germanism the world over, looked to Asia Minor as the only undeveloped field for German enterprise without the loss of German citizens. This plan was to be worked out in complete friendliness with the Young Turk Party,—which British diplomacy had not cultivated. It is really surprising that Germany risked war to accomplish her aims, and there is little doubt now that she would never have taken a warlike step for accomplishing what she planned and what could have been wrought by peaceful means under the shadow of the German military machine, if the individuals who think and plan for the German empire had not made a few serious mistakes in their reckoning. They misjudged England. They gambled on English labor and social troubles and the Irish question. They thought John Bull would hesitate till France was conquered. Otherwise the German Emperor would have assumed the pose of a Peace Angel when the events in the Balkans upset Germany's plans and placed barriers in her path leading from Hamburg to the Persian Gulf, surveyed and mapped, planned and plotted with German thoroughness.

There was nothing left up to the time of the Bucharest treaty, which terminated the Balkan War, but to push through the railroad to the Persian Gulf. That being accomplished, Emperor

William undoubtedly planned to convince Austria-Hungary, the Balkan States and Turkey by arguments and some clinking of spurs that it was to their material advantage to enter into a Customs Union with Germany. There is no reason to doubt that all these states would have benefited financially by such a move. Once the stomachs of the people were filled and their bank accounts started, Berlin would have woven political strands into the economic bonds which held these non-Germans to the German empire, and eventually absorb all these nations into the Confederation of Central Europe. If this vast project could be accomplished without war, the German Emperor could go to his grave under the cover of sanctimonious peace. But the whole structure of this colossal scheme was built on a foundation of the German war machine and the expansive commercial and industrial system of the German empire. In case of war, the plan contemplated further immediate annexation of territory which would not have been necessary under the scheme of benevolent absorption. In case of war, necessarily involving France and Russia, and some of the smaller nations, say Serbia and Belgium, the plan proposed to grasp western European territories also.

In other words, the plan, sanctioned by the German Emperor and his closest advisers, contemplated raising Germany to a world power of the first magnitude. It contemplated placing under the German imperial crown new territory to the extent of 3,303,515 square kilometers, occupied by a population numbering 112,881,000, of whom a little more than 12,000,000 were Germanic and German-speaking. These vast dominions were to be ruled by 68,000,000 Germans of the empire which at the beginning of the war occupied 540,858 square kilometers. [Excerpted from an article by John G. Holms in *Asia* for August.]

MILWAUKEE

MILWAUKEE has 14 tanning and leather dressing plants; one of them is as large as any in the world, and two or three others are very large. It has 27 shoe manufacturing plants, 16 glove and mitten manufacturers, 14 trunk and bag manufacturers and a score of other manufacturers of leather products. This city tans more leather than any other in the United States, and far more than all Canada. Its manufactures of leather gloves and mittens increased 800 per cent in ten years, making Milwaukee second only to the twin cities of Gloversville-Johnstown (N. Y.) in this line of manufacturing.

The manufacture of beer, which is commonly associated with

Milwaukee, has fallen to 4th place among the city's industries. In recent years iron and steel industries have led all others. No less than j0 manufacturing concerns manufacture iron and steel products in a large way. This activity is in keeping with the situation in all of the cities on the Great Lakes. This group of cities is rapidly rising to a dominating position in the manufacture of iron and steel. So advantageously are coal and iron ore brought together on the shores of these lakes that the Pittsburg district is being hard pressed to maintain its leadership. Milwaukee is sharing with the Buffalo district, Cleveland, Detroit, Toledo, Gary, and Chicago, in an enormous expansion of the iron and steel industry.

The flour-milling industry, at one time the leading one in Milwaukee, has greatly declined since Wisconsin ceased to be a wheat-growing state. Once Milwaukee had 14 flour mills and was the second city in the United States in this industry. Only one of the flour mills is still operating as such.

Slaughtering and meat packing remains one of the leading industries of the city. The major part of this is done in the suburb of Cudahy.

The coal trade of Milwaukee is very large. Some 28 coal docks skirt the harbor. They handle over five million tons of coal yearly. This is by far the biggest item in Milwaukee's tonnage. Shipments by lake from Milwaukee are no longer very large.

Three lines of car ferries connect the city with railway terminals on the Michigan side of the Lake. These ferry boats carry 30 to 35 freight cars at a time; this device considerably shortens the distance to Detroit, Buffalo, and the East as compared with the trip around the southern end of the lake by way of Chicago.

Milwaukee is one of the great primary grain markets of the country. In 1916, the city received 86,000,000 bushels of grain, over 55,000 car loads. Of about 60,000,000 bushels of grain shipped out of Milwaukee, only 3,000,000 bushels went by lake boats, to lower lake ports, while 43,000,000 bushels went by rail and 13,000,000 by car ferry.

R. H. W.

BUENOS AIRES

THE following description of the greatest of South America cities is excerpted from Professor Hiram Bingham's delightful book, "Across South America." *

"A generation ago the traveller to Buenos Aires was obliged to disembark in the stream seven or eight miles from the city,

proceed in small boats over the shallow waters, and then clamber into huge ox-carts and enjoy the last mile or two of his journey as best he could. Since then, extraordinary harbor improvements, costing millions of dollars, have been completed, and ocean steamers are now able to approach the city through dredged channels. Yet such has been the phenomenal growth of the port that the magnificent modern docks are already overcrowded.

"Buenos Aires will always maintain her political and commercial supremacy. She is not only the capital of Argentina, but out of every five Argentinos, she claims at least one as a denizen of her narrow streets. Already ranking as the second Latin city in the world, her population equals that of Madrid and Barcelona combined.

"Hardly has one left the docks on the way to the hotel before one is impressed with the commercial power of this great city. Your taxicab passes slowly through crowded streets where the heavy traffic retards your progress and gives you a chance to marvel at the great number of foreign banks, English, German, French, and Italian, that have taken possession of this quarter of the city.

"These streets may be so narrow that vehicles are only allowed to pass in one direction, but the shops are first class in every particular and include the greatest variety of goods, from the latest creations of Parisian millinery to the most modern scientific instruments. Fine book shops, large department stores, gorgeous restaurants, expensive to the last degree, emphasize the wealth and extravagance of the upper classes.

"There are many theatres and they have a brilliant season, which begins in June. The pleasure-loving Portenos are willing to pay very high prices for the best seats, and managers can offer good salaries to tempt the best performers to leave Europe. Variety shows are popular and carried to an extreme with which we are not familiar in the United States. Some of them are poor copies of questionable Parisian enterprises.

"The Porteno has not only forgotten his religion, he seems also to have lost the pleasing manners of his Castilian ancestors. I have been in eight South American Capitals and in none have I seen such bad manners as in Buenos Aires. To be sure, none of them are as rich and prosperous.

"Here the newly rich are in full sway and their ideas and instincts seem to predominate. On Sunday afternoon, all the world dashes madly out to the race course, where it exercises its

* Houghton, Mifflin & Co., Boston, 1911.

passion for gambling to the fullest capacity. In the Jockey Club inclosure are gathered the youth and beauty, the wealth and fashion of the city. The races that I attended drew an audience of thirty thousand. One race had a first prize amounting to fifteen thousand dollars. Facilities for betting were provided on an elaborate scale. The gate receipts and the proceeds of the "percentage" are enormous and have enabled the Jockey Club to build one of the most luxurious and extravagant club houses in the world.

"Very few wealthy families have a long-established social position. Culture and refinement are at a discount. Otherwise it is difficult to imagine how any society can tolerate such artificiality.

"It is hardly necessary to speak of the more usual evidences of great wealth, palatial residences that would attract attention even in Paris and New York, charming parks beautifully laid out on the shores of the great Rio de la Plata, and a thousand luxurious automobiles of the latest pattern carrying all they can hold of Parisian millinery."

CURRENT MATERIAL FOR THE GEOGRAPHY TEACHER

Increasing Dependence on the Tropics

MORE than 1000 million dollars' worth of tropical products were brought into the country during the fiscal year 1916. The exact total was $1,060,850,416, according to official figures of the Bureau of Foreign and Domestic Commerce, of the Department of Commerce, and this was a decided increase over the $807,642,182 of 1915, the $505,511,552 in 1905, and the $303,476,706 in 1895.

These large and rapidly increasing purchases of tropical products consist mainly of foodstuffs and raw materials not produced in the United States and of certain others grown in the insular territories. Sugar heads the list, with imports valued at $314,000,000 in the fiscal year 1916. That sum represents an increase of $57,000,000 over 1915 and $156,000,000 over 1914. India rubber, gutta percha, gutta joolatong and other substitutes for rubber showed imports in 1916 valued at $159,000,000 as against $86,000,000 in the preceding year. Imports of raw silk amounted in value to $124,000,000, a 50 per cent increase over 1915; coffee, $116,000,000, an increase of about 8 per cent over 1915; fibers other than flax, $56,000,000, an increase of almost 50 per cent; fruits and nuts, $55,000,000, a very slight increase; raw cotton,

$40,000,000, an increase of about 70 per cent; tobacco and manufactures of, $38,000,000, a decrease of about $2,750,000; and cocoa and chocolate, $36,000,000, an increase of 50 per cent over 1915. Other important items in this group are vegetable oils, $34,000,000, against $25,000,000 in 1915; tea, $21,000,000, compared with $18,000,000 last year; gums, $15,000,000, against $12,000,000 in 1915; dyewoods and extracts, $10,000,000, against $5,000,000 in 1915; spices, $9,000,000, against $6,000,000 in 1915; indigo, $8,000,000, against $1,600,000 in the preceding year; rice, $6,200,000 against $6,400,000 in 1915, and cabinet woods, $4,000,000, against $4,300,000 in 1915. Feathers, ivory, sago and tapioca, vanilla beans, licorice root, opium, quinine-bearing barks, and sponges, in sums varying from about $3,000,000 down to less than $1,000,000 each, complete the list.—[*Commercial America.*]

Trade of the Philippines

The trade of the Philippine Islands is having a steady growth of quantity and quality. The changes in the currents of the world trade that recent developments of the war have made are seen as plainly in the Far East as anywhere else. The hindrances to free exchange and transportation of the long-voyage commerce of the world are causing a growth of local commerce. There are important increases in the exportations of Philippine products that are not directly traceable to war-influences, but they are probably indirectly due to the revolutionary differences in the whole world's trade. Whatever the causes, the Philippines are exporting largely and they are exporting products in a higher condition of industrial preparation.—[*The Americas.*]

Seventy-Five Million Tons of Ore Mined in 1916

The iron ore mined in the United States in 1916 reached a total of 75,167,672 gross tons, the greatest annual output ever made. The shipments from the mines in 1916 were 77,870,553 gross tons, valued at $181,902,277. The quantity mined in 1916 was more than 19,600,000 tons greater than that mined in 1915. The increases in quantity and in value of iron ore shipped in 1916 amounted to about 40 and 80 per cent, respectively. The average value per ton at the mines in 1916 was $2.34, as against $1.83 in 1915. These figures, which were compiled under the direction of E. F. Burchard, of the United States Geological Survey, include for 1916 only iron ore containing less than 5 per cent of manganese.

Iron ore was mined in 24 States in 1916 and 23 in 1915. Minnesota, Michigan, and Alabama, which have for many years

produced the largest quantities of iron ore, occupied in 1916 their accustomed places.

The Lake Superior districts mined nearly 85 per cent of the total ore in 1916 and the Birmingham district about 8 per cent. No other district except the Adirondack mined as much as 1,000,000 tons. The increase in production in 1916 was especially marked in the Adirondack and Chattanooga districts—54 and 55 per cent respectively—but every district showed an increased output over that of 1915.

All the ranges in the Lake Superior district mined a larger quantity of iron ore in 1916 than in 1915, and the largest increases were in the Gogebic and Menominee ranges—54 and 43 per cent respectively. The output of the Cuyuna range exceeded 1,500,000 tons for the first time.

There were 12 mines in the United States that produced more than 1,000,000 tons of iron ore each in 1916, five more than in 1915. First place in 1916 was held by the Hull-Rust mine, at Hibbing, Minn; second place by the Red Mountain group, near Bessemer, Ala.; third place by the Fayal mine, at Eveleth, Minn.; and fourth place by the Mahoning mine, at Hibbing, Minn. The production of these mines in 1916 was, respectively, 7,658,201, 2,899,588, 2,252,008, and 2,215,788 tons. The increase at the Hull-Rust was 232 per cent, making the production of this mine more than one-tenth of all the ore mined in the United States in 1916. These records illustrate the rapidity with which the rate of output of mines in the Lake Superior district may be increased. None but open-pit mines could be made to respond to demand to such a degree.

Deep Salt Bed

In Kansas a deep well struck rock salt at 690 feet below the surface and penetrated 600 feet of rock salt in beds from 5 to 60 feet thick, according to the United States Geological Survey, Department of the Interior. A large area in this State is underlain by salt, which is mined by many shafts and obtained by pumping brine. Drilling for oil in Texas and Louisiana has revealed the presence of tremendously thick deposits of rock salt at a depth of a few hundred feet. Thicknesses of 2,000 feet are common, and one drill hole passed through more than 3,000 feet of rock salt. Most of the salt made in Utah is produced by evaporating the water of Great Salt Lake, and in California by evaporating sea water. These sources are inexhaustible, and the limit of production by solar evaporation will therefore never be reached.

RECENT PUBLICATIONS

BRAZIL TODAY AND TOMORROW. By L. E. Elliott, Literary Editor of the Pan-American Magazine. X+338 pages; illustrated. The Macmillan Company, New York, 1917. $2.25.

The author has spent several years in Brazil and has been associated with South American interests generally through her connection with the Pan-American Magazine. Seventy-five pages are given to the history of Brazil and fifty to social conditions. Transportation, Agriculture, Manufacturing, Finance, and Commerce are all treated with considerable fullness. The information is brought down almost to date, and is, on the whole, reliable. There is a tendency to give an unduly optimistic view of affairs in Brazil, and to omit facts which are unfavorable to that country. One feels that the book may be the truth, yet not the whole truth. The two maps intended to show the value of agriculture and industrial products by states, are evidently based in part upon estimates that are too liberal.

THE FRONTIERS OF LANGUAGE AND NATIONALITY IN EUROPE. By Leon Dominian of the American Geographical Society. Published for the Society by Henry Holt and Company, New York. XVIII+375 pages; 7x10 inches. 1917.

Mr. Dominian is of Armenian descent, a graduate of Robert College, Constantinople, and is particularly well equipped for carrying on investigations in the field with which the book deals. There are many colored maps, sketch maps, half tone cuts and other illustrations. The maps are excellently drawn and printed. The point of view is distinctly geographical. In the preface the author says: "Never has it been realized better than at the present time that an ill adjusted boundary is a hatching oven for war. A scientific boundary, on the other hand, prepares the way for permanent good will between peoples." Mr. Madison Grant has written an Introduction to the book in which he says: "In the present work the problems arising from the distribution of the main European languages and from their relation to political boundaries are discussed with clearness and brilliancy. The text embodies a vast collection of facts and data laboriously collected by the author, who has applied to the subject his familiarity with Eastern languages, as well as an impartial vision which is hard to find in these days * * * ."

The book is a highly valuable contribution to our rather imperfect knowledge of a big subject. In binding and general make-up it displays the same excellence as Dr. Bowman's "Andes of Southern Peru," issued some time ago by the American Geographical Society.

QUESTIONS ON ASIA

1. Name and locate (a) the independent nations of Asia; (b) ten large rivers; (c) the bounding waters; (d) four important flood plains.
2. Locate: Lake Baikal, Aral Sea, Himalaya Mts., Mongolia, Tibet, Manchuria, Chosen, Hondo, Formosa, Malay Peninsula, Ceylon, Burmah, Assam, Peking, Shanghai, Hongkong, Hankow, Canton, Tokio, Yokohama, Osaka, Nagasaki, Singapore, Calcutta, Colombo, Aden, Madras, Bagdad, Jerusalem, Bombay, Damascus, Smyrna, Vladivostok, Port Arthur, Delhi, Manila, Batavia.
3. What parts of Asia are (a) tundras, (b) steppes, (c) plateaus, (d) deserts, (e) agricultural lands?
4. What parts of Asia are in the monsoon region? Describe the monsoons.
5. Make a list of ten significant facts about China. Can you account for each of them?
6. What are China's most pressing needs? What are China's principal contributions to foreign trade? Extent of known mineral resources?
7. In what lines has Japan made remarkable progress? Wherein lies Japan's strength? weakness? Her area and population? Proportion of arable land? (15 per cent.) Chief crops? Mineral resources? Most pressing needs? Annual value of foreign trade? Development of manufacturing?
8. India; Size? Population? Climatic conditions? Surface features? Races? Government? Religions? Leading cities? Five important crops? Three or four chief exports? What minerals are produced? To what extent is manufacturing developed? How does India rank as a cattle grower? cotton producer? tea producer? jute producer? For what is jute used? Where is the tea of India largely grown? jute? rice? wheat? Why does England attach so much importance to India?
9. Why is the per-capita foreign trade of Asiatic countries small? Why are western nations so anxious to develop their trade with Oriental nations?
10. Why was the building of the Trans-Siberian railway of great importance to Russia?
11. Why is Japan very desirous of gaining a foot hold in China?
12. Give an account of the expansion of rubber plantations in southeastern Asia and near-by islands.
13. Where are the great tin mines of southeastern Asia?
14. What does southwestern Asia contribute to the world's commerce? Why is the amount not large?

FOREIGN TRADE OF THE UNITED STATES.

Imports	1914	1917*
Foodstuffs, crude	$ 247,948,000	$ 335,000,000
Foodstuffs, manufactured	227,644,000	346,000,000
Raw material for manufacturing	632,866,000	1,102,000,000
Manufactures for manufacturing	319,275,000	465,000,000
Manufactures ready for use	449,318,000	369,000,000
Miscellaneous	16,874,000	16,000,000
Total imports	$1,893,926,000	$2,633,000,000
Exports (domestic)		
Foodstuffs, crude	$ 137,495,000	$ 522,000,000
Foodstuffs, manufactured	293,218,000	734,000,000
Raw material for manufacturing	792,716,000	737,000,000
Manufactures for manufacturing	374,224,000	1,190,000,000
Manufactures ready for use	724,908,000	2,935,000,000
Miscellaneous	7,122,000	98,000,000
Total domestic exports	$2,329,684,000	$6,216,000,000
Foreign mdse. exported	34,895,000	63,000,000
Total exports	$2,364,579,000	$6,279,000,000

*For year ending in June.

Imports from—	1914	1917
Europe	$ 895,603,000	$ 601,000,000
North America	427,399,000	775,000,000
South America	222,677,000	534,000,000
Asia	286,952,000	606,000,000
Africa	19,149,000	55,000,000
Oceania	42,144,000	62,000,000
Grand total	$1,893,926,000	$2,633,000,000
Exports to		
Europe	$1,486,499,000	$4,328,000,000
North America	528,645,000	1,137,000,000
South America	124,540,000	257,000,000
Asia	113,426,000	376,000,000
Africa	27,905,000	78,000,000
Oceania	83,568,000	103,000,000
Grand total	$2,364,579,000	$6,279,000,000

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THE METAL RESOURCES EMPLOYED IN THE BRITISH IRON AND STEEL TRADE

By George G. Chisholm
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ONE of the early results of the shock given to commerce by the war was the creation by the British government of a Department of Scientific and Industrial Research, and in the summer of 1917, an Advisory Council working in connection with that department issued a "Report on the Resources and Production of Iron Ores and other Principal Metalliferous Ores used in the Iron and Steel Industry of the United Kingdom," * to which the readers of the Journal of Geography may like to have their attention called; all the more because it is even more comprehensive in the information it furnishes than its title indicates. In compact form (it is only 145 pages in length) it gives particulars not only of the extent and situation of the iron ore deposits and the production of ore in the different parts of the United Kingdom, but also notes on the iron ore deposits of the different members of the British Empire, and on those of most foreign countries. Among these, however, Germany and Austria-Hungary are not included on the express ground that the ores produced in those countries are all required for home use, and are hence not available for the British iron and steel industry, although this consideration does not prevent the insertion of particulars with regard to the deposits of the United States, in which country we are told "the economic and industrial conditions render it unlikely that those ores will ever be imported into this country," that is, the United Kingdom. In addition to that considerably more than two-fifths of the report is taken up with notes on the occurrence, composition, and uses of the ores of the principal metals other than iron used in the iron and steel industries. The report also gives references to the original sources of information.

An introductory statement gives the total estimated iron resources of the United Kingdom at 39,500 millions of tons, † but how misleading such an estimate may be, if quoted without the warnings given in the report, is shown by the fact that the Scotch blackband iron stone is estimated at 8,000 million tons, but we

* London: H. M. Stationery Office; Price 2 s. net.
† Understand throughout long tons of 2,240 lbs.

are told (p. 10) that "in 1910 about 110 million tons had been obtained, and there was no doubt that the bulk of the more valuable blackband deposits was exhausted"; and again (p. 25), that of the 700 million tons of coal measure ironstones in a part of Durham "it is likely that none, or very little of it, could be worked at a profit."

A table of comparative statistics of the production of pig iron by countries shows that in 1913 Great Britain still came third among the countries of the world, the United States, Germany (with Luxemburg), * and the United Kingdom ranking almost in the proportion of 3, 2, 1, and was followed by France, Russia, Belgium, and Austria-Hungary. Further particulars given in the same table enable us to calculate that of the ores, whether native or foreign, used in the industries of those countries, the proportions obtained in the form of pig iron in that year were as shown below:—

Russia	Belgium	France	U. S.	Austria-Hungary	U. Kingdom	Germany
61%	55%	51%	48%	46%	43%	41%

The high place belonging to Russia is due to the fact that the bulk of the ores produced and used there (Russia has no import of ores) are from the Krivoi Rog deposits, which yield from 55½ to nearly 67% of iron, while the low place belonging to the U. Kingdom and Germany is due to the generally small yield of their native ores, and the proportion in their case would be much lower if it were not that the imported ores naturally afford a relatively high yield. If it were not so it would not pay to import. Most of the British ores yield less than 33% of iron, the only ones giving on the average more than 50% are the red hematites of Cumberland and North Lancashire, (Furness), the aggregate yield of which is diminishing.

The proportion of foreign to native ore used in the British iron and steel industries has increased from about one-seventh in 1880 to about one-third in 1910 and 1913. There was indeed a period in which the production of native ore was pretty steadily diminishing, but that production reached a minimum in 1893, since which date it has shown a decided upward tendency. Sev- [illegible] fields are still declining in their output, most markedly the [illegible]ancashire, Staffordshire, and Scottish fields; those which [illegible]tributed most to counterbalancing this decline being the eastern midlands—Lincolnshire, Leicestershire, and

[illegible] 1913, production of the United States 31, German Customs Union [illegible]ted Kingdom, 10.3 million tons.

Northamptonshire. Since 1900 there has also been a rise in the output of the Cumberland hematite deposits, but not enough to make good the fall between 1880 and 1900.

These red hematite deposits both of Cumberland and North Lancashire are famous not only for their relatively high iron content, but also for their low percentage of phosphorus—generally not above 0.01 per cent—which renders them well suited for use in the Bessemer process. All these Cumberland hematite ores have lately been taken over by the British government. Though the production of the Furness district has latterly been declining, it is pointed out that there is hope of increased production from a part of the district which has never been tried, namely the Duddon estuary. These hematite ores occur very largely in pockets along lines of faulting in the Carboniferous Limestone. Now "two lines of faulting cross the sands, and it is considered that the whole untried area of limestone between the two faults is likely to carry large bodies of ore. The one at Hodbarron (the principal Furness mine), on one (the west) side of the Duddon Sands, and at Askam, on the other side, are very similar in quality" (p. 13).

The Cleveland district in the north-east corner of Yorkshire, first worked at Grosmont in 1846 and then at Eston in 1850, has long produced a greater quantity of ore than any other district in the United Kingdom, though the amount now produced there is less than in 1880. The ores are got from the upper part of the Middle Lias. The average iron content is, however, little more than 27% and the phosphorus content about 0.43 per cent, so that it requires the basic process to render it available for the large scale production of steel and ingot iron. It was, in fact, in this district that the process was invented. Another drawback is that owing to the composition of the ore the sulphur cannot be got rid of in calcining. It combines with the lime present in the ore, usually in the proportion of 5 per cent. On the basis of the production in 1880 it was estimated that all the ore of this district that it would pay to work, roughly 375 million tons, would be used up by 1960. It may be presumed that the reduced production since then extends the life of the district, which in all probability will be still further prolonged by a further decline in the annual production.

In the West Riding of Yorkshire the iron ores worked in the neighborhood of Leeds, Bradford, and Barnsley, belong to the Coal Measures, and though the output is now small, they have long been celebrated for the high quality of the iron, both cast and forge, made from them.

The Northamptonshire ores now follow next after the Cleveland in the amount of their annual production. They belong to the geological zone known as the Northampton Sands, the lowest member of the Oolites, and are generally a sandy brown Hematite (limonite), occurring in strata which have an aggregate thickness of about 80 feet, the individual seams having a thickness rising to as much as 20 feet. Most of the worked seams have a thickness of four to thirteen feet. The workings are widely scattered over the county. Twenty-one different producing localities are enumerated. The main output so far has been from open workings, the upper covering being first stript off as in the Mesabi range in Minnesota, and some of the ironstone is capable of being excavated as in that field by steam shovels. Underground mining, however, has been begun and is largely on the increase. The quality of the ore is very variable, but the iron content is mostly above 33%, in some cases above 46%.

The Lincolnshire ores are confined to the west of the county and are worked both in the north and the south at the localities indicated in the map in my Handbook of Commercial Geography. But it is in the northern field that the greatest production takes place and that there is now a rapid increase in output. These ores belong to the Middle and Lower Lias and were first worked in 1861. The iron content varies from 22 to 33 per cent, and in an average sample of good ore the phosphorus is under 0.4%. The total resources are stated to be at least 100 million tons. The ores of South Lincolnshire and the contiguous area of North Leicestershire are both found in calcareous deposits of the Middle Lias, and it is estimated that they also may contain 100 million tons, on the assumption that they are present in workable quantity under the whole of the area extending from the present workings close to Grantham to those at Caythorpe, about 10 miles north of Grantham. The average iron content is about 34%, phosphorus 0.6 per cent.

The iron ores of Staffordshire belong to the Coal Measures both of the north and south, and though the workings are numerous, the total production is now under a million tons, varying considerably in quality. The aggregate output diminished from 1761 thousand to 891 thousand tons between 1880 and 1913.

These are all the producing districts of any importance in England and Wales, but it is worth noting that in the attempts recently made to develop the Kent coalfield, a valuable deposit of oolitic ironstone has been met with near Dover, including one bed with a total thickness of about 16 feet. "The ore is siliceous and contains about 32 per cent iron, 0.4 per cent phosphorus, and 8 to 10 per cent of lime."

The Irish production is now quite small, but that of Scotland, chiefly in the Glasgow district, though the Lothians and Fife also contribute, is still important (above half a million tons annually), though less than a fourth of what it was in 1880. The decline took place most rapidly between 1880 and 1890 and is to be explained chiefly by the change from wrought iron to steel in shipbuilding, the Clyde ironstone being excellent for the making of wrought iron but not suitable for steel making on a large scale. All these ores of the Scottish midlands belong to the Coal Measures, the most important being the well-known blackband, in which the average percentage of iron is about 38, with about one-fourth of one per cent of phosphorus. Recently a deposit at the junction of the Upper and Middle Lias has begun to be worked on the island of Raasay, to the east of Skye. The first cargo was shipped to Glasgow in 1911. An analysis showed 25 per cent of iron in the raw stone, about 36 per cent after calcination, and 0.012 per cent of phosphorus.

As the Report gives no values for the iron ore produced it does not furnish the means of indicating how far the map on p. 225 of my *Handbook of Commercial Geography* needs correction, but we can get that information from the more detailed mining statistics of the United Kingdom. I have not yet gone into this matter myself, but from the examination which I have made of the figures it would appear that the only changes required in that map are the insertion of at least one additional intermediate dot in North Lincolnshire adjoining Scunthorpe (and Frodingham, which is close by) and possibly the raising of the size of one or two of the dots in Northamptonshire.

A table on p. 11 of the Report shows that the only countries which in 1913 furnished the United Kingdom with as much as one hundred thousand tons of iron ore were, in the order of importance, Spain (which supplied more than three-fifths of the total), Algeria, Norway, Sweden, France, Tunis, Greece, and Newfoundland, though nine other countries are individually mentioned.

The Report gives particulars only about metalliferous ores, but seeing that the main concern is with the resources at the disposal of the British iron industry one cannot but feel disappointed at the lack of information as to some non-metalliferous minerals of importance in connection with that industry. One would, for instance, have been glad to have particulars, in connection with the principal iron ore supplies, as to the nearest available limestone, ganister, and coke or splint coal, that is, the kind of coal that can be used raw in the blast furnace.

THE WEATHER FACTOR IN THE GREAT WAR, VII SPRING AND SUMMER, 1917

By Robert De C. Ward
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(Concluded from October)

The Balkan Campaign

During March and April much cold, unfavorable weather, with heavy snows, especially in the mountains, prevented extended military movements, although local fighting continued. In the latter part of April (28th) snow 6-8 ft. deep was reported in the mountains, snow falling at the greater elevations and rain in the valleys. Even May brought a fair share of foul weather, and much fog. The latter was used on at least one occasion (May 19) as a cover for a Bulgarian attack near Lake Presba. A British despatch from Salonika, June 19, stated that "owing to the advent of the malarial season, troops east of the Struma were somewhat withdrawn."

The Russo-Turkish War Zone

There is practically nothing to report. The heavy winter snowstorms which hindered operations all through the colder months, continued well into the spring in this mountainous and elevated region. An interesting despatch dated March 17 reported: "The forward movement of our (Russian) troops is proceeding under exceedingly difficult conditions. Passages which have been cut through snow that is often higher than a man on horseback are frequently filled up again by the furious snowstorms. Owing to the absence of villages, our troops have to shelter themselves at night in caverns made in the snow." The breaking down of the Russian offensive, here as elsewhere, put a stop to military activity of importance.

The Campaign in Mesopotamia and Palestine *

In the House of Commons on Mar. 12, 1917, Mr. Bonar Law, in announcing the fall of Bagdad, said: "Notwithstanding heat and dust the British made a brilliant march toward Bagdad." The pursuit of the Turks "was conducted in a country destitute of supplies, despite the commencement of summer heat." Gen. Maude reported that "during the recent fighting, fierce gales and

* The Mesopotamian campaign was, during the spring of 1917, extended by the British forces into Palestine.

blinding dust storms, the lack of water away from the river, and the vigorous pursuit, made the operations arduous." †

Late in March (31st) the British and Russian troops, in their converging march toward Khanikin, had difficulty because of wet snow. Great difficulty has from the first resulted from the aridity of Mesopotamia. The former canal system has long ago fallen into disuse. Water can only be obtained from the rivers, and many of these dry up completely in the hot summers. Lack of water was also a serious difficulty in Palestine, into which region the war was carried by the British in the spring (1917). The season selected for this invasion was the most favorable, for after the winter rains there is then the most abundant fodder for the animals; occasional showers refresh the ground; the heat is not as intense as later in the year. Water and provender are more abundant in the north than in the southern sections. On Apr. 2 Mr. Bonar Law, in the House of Commons, said that the operations against Gaza were most successful, and if it had not been for a fog, which delayed the attack, and a shortage of water, complete disaster would have overtaken the Turks. And Major Gen. F. B. Maurice, on Apr. 5, said that complete British success was only prevented by "a thick seven hours' sea fog." An unusual occurrence was reported on April 10, when British fighting in Mesopotamia "had to be temporarily suspended owing to a mirage, but upon this lifting, our offense continued." The intense heat constantly interfered with the activity of the troops. On Apr. 13 the heat "rendered the task of keeping in touch with the retreating enemy difficult." A Constantinople despatch (Apr. 26) reported that Turkish (?German) airmen on the Sinai front totally destroyed the water supply system which the British had constructed for their troops.

As a whole it is evident that both British and Russians did their best (until the Russian Revolution demoralized the troops) to bring the campaign in Mesopotamia and Palestine to a successful conclusion before the intense summer heat and lack of water made operations more difficult, if not impossible. The preparations were far ahead of those of 1916. Ice plants; refrigerating barges for meat; hospital ships with complete electrical equipment for lighting, cooling and ventilation; transportation, etc., were all carefully planned for. "The soil, the rain, the climate, the floods, the flies and the heat combine to make the conduct of a campaign in the Tigris valley during the summer months a task of stupendous difficulty. These difficulties are being tackled

† A despatch dated March 17 notes the withdrawal of the Russian troops to a town on the Persian border north of Bagdad on account of the heat, which made a retreat to the mountains advisable.

and overcome with success." There could be only very slight activity during the hot season. One of the few reports (July 11) mentions a British advance which was broken off owing to the extreme heat. A despatch of July 12, dated Washington, notes Turkish preparation for a campaign for the recovery of Bagdad when cooler weather sets in in the fall. "The heat in Mesopotamia at present makes a campaign on a grand scale almost impossible."

The War in East Africa

Emphasis upon the extraordinary difficulties caused by the rainy season, and upon the injurious effects of the tropical climate upon the white troops are the two striking facts in the East African reports. Lieut.-Gen. Smuts (Mar. 12) said: "I have found the white troops were unable for any length of time to stand the climate . . . . The operations . . will be undertaken by native troops whom I have trained . . . Fever, even during the dry season, is deadly to Europeans." The rains are reported to have been unusually heavy, "wettest in 9 years"; "of a character quite unusual in intensity. The heavens came down in floods; rivers filled up; bridges were washed away; large parts of the country became swamps and lakes." For many weeks the army in the interior was cut off from its base. Thousands of white men were sent to Cape Town to recuperate. "Months will elapse before a large proportion of these will be in shape to return to the front." On May 29, the "exceptional rainy season" was reported at an end. The improved weather brought a renewal of military activity.

The War in the Air

On Mar. 13, Mr. James Ian Macpherson, Parliamentary Secretary to the Under Secretary of State for War, said: "During the winter all the belligerents endeavored to improve and to increase their air service. With the advent of good weather severe contests must be expected." Aerial activity has see-sawed with the weather, low clouds and gales interrupting reconnaissance work and fighting; fine spells leading to greatly increased activity. Yet stormy weather, with high winds, is obviously less and less of an obstacle to war flying. Even thunderstorms have not prevented flights. On April 10 the airmen flew though the day was anything but ideal. "It was blustery from sunrise to sunset, and furious snow-squalls were in the air at half-hour intervals. During these the machines were completely submerged by the snow barrage." The latter is a new term in military meteorology. Despatches have frequently mentioned the use, by

the Germans, of clouds for concealing themselves, or "digging themselves in." The German aviators seem to have been especially trained in the defensive use of clouds. This point adds emphasis to a study of cloud types, and their conditions of formation, on the part of our aviators. The Germans "lie in wait high above fleecy clouds, and dart upon isolated Allies' machines; avoiding open conflicts when possible. The Germans attain their best success when there are clouds. Hence the British and French airmen hope for cloudless days." Several British machines were caught in a sudden severe thunderstorm on July 30, and four were lost. During the British attack in the vicinity of Lens (August), aerial operations were carried on at times when "more unfavorable weather could hardly have been selected." On Aug. 10 strong westerly winds and thick clouds made it difficult to engage the enemy's machines. These westerly winds "greatly favored the enemy," forcing some British aeroplanes to land behind the enemy lines, i. e., to leeward. A similar condition was noted on Aug. 18, when twelve damaged machines were unable to reach the British lines, and on other days.

There have been numerous German Zeppelin and aeroplane raids on England. Most of these were made under weather conditions so favorable that it is clear, as it has been since the war began, that the German military meteorological service has been doing good forecasting. Usually the weather has been fine, with light winds, but hazy, so that the German airships could not be seen distinctly. On one occasion (May 23) the sky was overcast, and a thick bank of rain clouds made it possible for the raiders to escape. On another (June 5) a strong east wind was against the Germans on their return, but the haze and light clouds favored them. On another, before the start, as one of the Germans reported, the meteorological expert was consulted as to the probable weather. He replied: "Splendid; it could not be better." There was, as usual, a faint haze and light winds, such as anticyclonic conditions over the North Sea will give. On Aug. 18 a German air squadron flew over Dutch territory. Holland protested, and Germany replied that the airships had lost their way in the thick clouds.

The effective use of aircraft against submarines depends upon the possibility of seeing the U-boats from a considerable altitude. The foam in the wake of the periscope usually indicates the position of the vessel. Hence clear weather and calm water are the best conditions for the attacking aeroplane. In stormy weather it is difficult, if not impossible for [illegible]erial observer to detect the wake of the periscope. On the c[illegible]d,

rough weather is unfavorable to the operation of submarines. The higher the observer in the air, the greater his range of vision, but the greater also the difficulty of seeing the object of the search.

THE WAR AT SEA

A British naval attack was made on Zeebrugge in a fog ("mist") and the German batteries were therefore unable to do effective work owing to the fact that the British vessels were concealed. In connection with the arrival of our own destroyers in British waters it is to be noted that our navy has been largely a "warm weather navy," the winter cruises having been mostly in the West Indies. The men were not properly equipped for cold weather, and were supplied, according to the despatches, with warm clothing on their arrival in England. The Navy Department also took steps to provide them with suitable clothing for the winter, which is stormy and cheerless in the waters north of Europe.

MISCELLANEOUS

The effect of weather upon crops is, indirectly, of military importance. Germany seems to have experienced a prolonged drought in May and June with "intense heat." Berlin reported the hottest June 17 in 70 years. Cattle suffered; and much damage was done to fruit, vegetables and other crops. Forest fires were common.

Harvard University, Sept. 1, 1917.

FRUIT GROWING IN MICHIGAN

By HAZEL M. KETCHAM
Grand Rapids, Mich.

CLIMATIC CONDITIONS

THE fourteen counties of Western Michigan that border on Lake Michigan and reach from the Indiana state line to the Straits of Mackinac form one of the great fruit belts of the United States. In this belt are raised apples, peaches, apricots, pears, plums, prunes and many varieties of small fruits.

The latitude of the southern peninsula of Michigan and that of Wisconsin are almost the same and yet in Wisconsin very little fruit is raised, while in Michigan there is a great abundance. This great difference is mainly caused by the difference in the position of the two states relative to the Great Lakes.

The winter winds in these states are chiefly from the west and northwest and in passing over Lake Michigan they are raised in temperature from ten to twenty degrees, because a large body of

water is warmer than the adjoining land in winter, consequently the winds are warmer when they reach Michigan. This fact is of great importance because peach and apricot trees cannot stand an extremely low winter temperature.

In summer the winds are principally from the west or southwest and in passing over the lake they are cooled, because in summer a large body of water is cooler than the adjoining land. Thus western Michigan has very few long hot spells which are so detrimental to developing and growing fruit. The winds modify the short periods of hot weather that usually occur in March, thus retarding the early swelling of fruit buds until the danger of spring frosts is over. Likewise the lake influence moderates the cold waves which often occur as late as May. The general effect is to produce an even and gradual increase in spring temperature and to give greater immunity from killing frosts.

The average precipitation for the southern peninsula is 33 inches. The rainfall gradually increases from about two inches in March to a maximum of three and one-third in May, then gradually decreases during July, August, and September. The rainfall is greatest during the season when the fruit is growing, and least at the season when apples and peaches need a great deal of sunshine in order to color well. The annual amount of sunshine is over fifty per cent of the possible amount, most of it coming between March and October.

The average elevation of the lower peninsula is 850 feet above sea level, or 270 feet above the level of Lake Michigan and Lake Huron. The entire state has been glaciated and glacial deposits vary from a few feet to three hundred feet in depth. In the northern part there is a broad upland and much of the soil there is thin and sandy. In the southeastern part there is a broad ridge and much of the surface is rough, but the remainder of the state is a rolling plain. The soil in the southern part is deep and of many types, but the principal soils are loams and sandy loams.

Growth of the Fruit Industry

There was a wide range of wild fruits indigenous to Michigan, such as the red and black cherry, crab apple, strawberry, dewberry, blackberry, huckleberry, red raspberry, gooseberry, and cranberry. The early apples and pears brought by the French missionaries produced trees of wonderful vigor and fruitfulness, and one may still see an occasional knarled old apple tree which was planted by those early settlers. At first fruit was raised only as an accompaniment to the farm or city home and was confined to a few small areas along Lake Michigan and the southern counties. No spraying was required, as there were no serious insect

pests or diseases. With the rapid growth of cities and the development of railroad and boat lines the raising of fruit on a commercial scale has become an important industry. A large amount of the Michigan fruit is sent in refrigerator cars to the eastern cities and a great deal of it is sent by boat to Chicago, Milwaukee, Buffalo and other large lake ports.

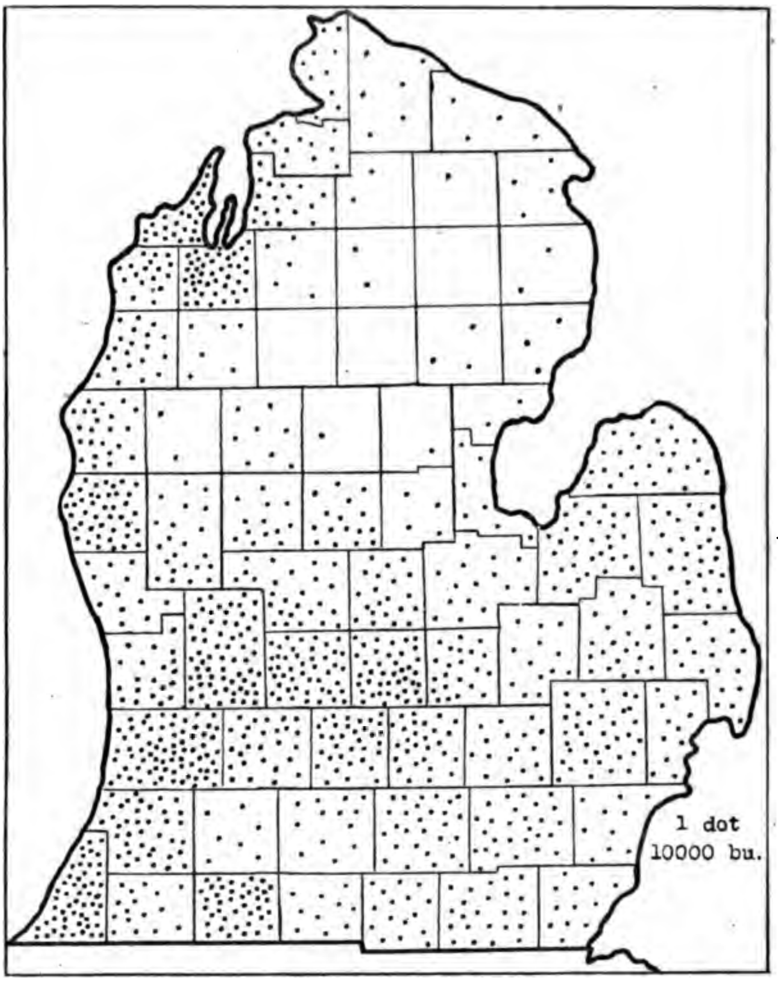

Fig. 1. Distribution of Apple Growing in the Southern Peninsula of Michigan (U. S. Census of 1909).

In Michigan small orchards of from twenty to forty acres have, on the whole, proved the most profitable, but at the same time a small orchard is at a disadvantage when it comes to handling the crop, and cold storage can be profitably provided only when one has a large orchard. The fruit growers may in time

put up association cold storage plants and overcome that difficulty the same as they are overcoming the first mentioned difficulty.

The Fruit Belt

Apples and peaches are the most important commercial crops, although cherry raising is a large industry in parts of the state.

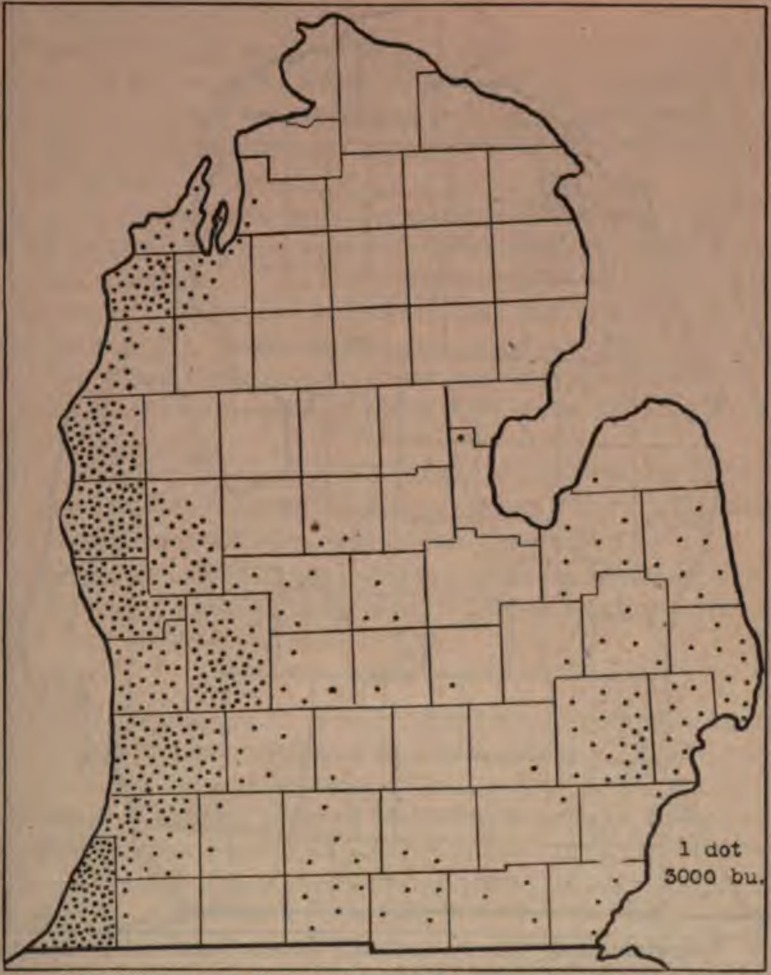

Fig. 2. Distribution of Peach Growing in the Southern Peninsula of Michigan (U. S. Census of 1909).

The apple growing region covers the entire southern part of the state up to the thumb and along the western shore to the Straits of Mackinac. Apples are raised in every county, but in the apple region mentioned there are thirty-nine counties with 202,587 acres of land suitable for apples. In the beginning, the southeastern part of the state was the great apple region, but as

the apple orchards died out they were replaced by other things, and that part of the state now produces fewer apples than it did thirty years ago.

Peaches are raised in a narrow belt along Lake Michigan, and some counties in the southern half of the state have smaller areas where the peach seems to thrive. This is the most hazardous

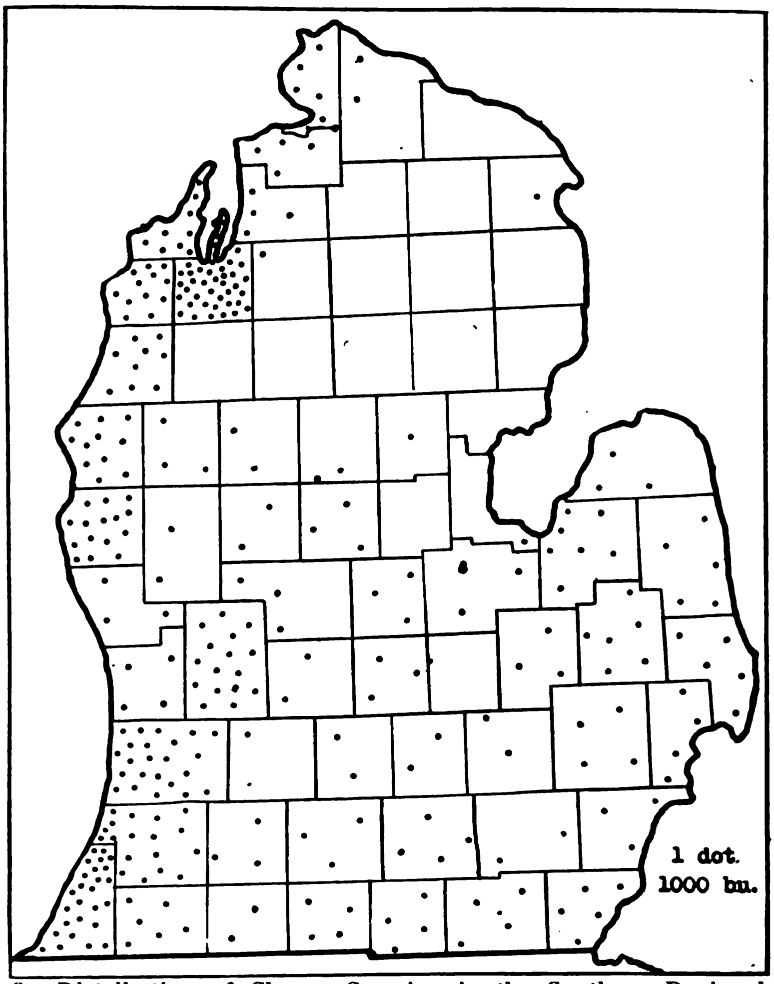

Fig. 3. Distribution of Cherry Growing in the Southern Peninsula of Michigan (U. S. Census of 1909).

of the fruit crops, but it has a great merit from a commercial standpoint on account of the early bearing of the trees.

In October 1906 a devastating cold wind from the northeast swept over the state and left in its wake a million dead peach trees, wiping out in a night some of the most productive orchards of western Michigan. Fortunately such cold winds are rare. Today most of those regions have been replanted and planted

more wisely. A good elevation and good air drainage is necessary for a peach orchard and the peach belt of today in Michigan is determined by the climatic conditions more than by the soil.

Cherries at first were raised commercially in only a few of the southern counties but with the developing of the western part of the state, the cherry industry, like the apple and peach industry, became more important there especially in the Grand Traverse region.

From the early pioneer days in that region the cherry has been one of the favorite fruits because of its adaptability to the soil and climate and its general usefulness. Cherry growing now is of large commercial importance, most of the fruit being shipped out by boat.

One of the largest cherry orchards in the state is near Northport and is 200 acres in extent with 4,000 trees. A transit was used in setting the trees so that every tree might be accurately placed, and in the orchard there are some rows nearly a mile long and perfectly straight. A power tractor is used upon the farm to cultivate the ground between the trees and no intercropping is permitted, so that every ounce of plant food in the soil may be available for the trees.

Pears and plums are grown in all of the western and southern counties, but the pear needs a strong, heavy soil, whereas peaches and sour cherries will flourish on lighter soil.

The grape belt is along Lake Erie and the southern shore of Lake Michigan, and this crop is each year becoming more profitable.

Fruit Growers' Association

The fruit growers of western Michigan have united in an association for the promotion of the fruit industry. There are also county associations and some of them send a man to the city, where they send the most of their fruit, to take charge of the fruit and find buyers for it. Some of the apple growers belong to an association which sends out an inspector to inspect the apples after they have been packed in boxes. If the fruit passes the inspection the trade mark "Sunnyripe" is put upon it. Apples marked thus have found great favor in the East and in England, where there is an increasing demand for "Sunnyripe" apples.

All over Michigan evaporating factories, canning factories, and cider mills are being built, for the growers are beginning to realize more and more each year that it is better to sell only their choice fruits and to turn the rest of their crop into some of these by-products.

Michigan apples have a strong competitor in the western apples. The western fruit looks well but it lacks the flavor of the eastern apple. Then, on account of the expense of irrigation and great distance from the eastern market they are very expensive. So that when the eastern fruit growers as a whole learn how to pack their fruit with the same care that the western fruit grower uses and to market it in the same business-like way, the west will be out of the market unless they find a place for their apples in the Orient.

Michigan's Production

The production of all orchard fruits in 1909 was 54.4% more than in 1899 and there were three times as many grapes in 1909 as in 1899. The value of all orchard fruits in 1899 was $3,670,000 and in 1909 it was $9.021.000. The value of grapes in 1899 was $503.000 and in 1909 it was $1,531,000.

Michigan and Wisconsin Contrasted

The soil of Wisconsin is similar to that of Michigan and the latitude of the two states is about the same, but the climate is not. In winter there are often extremely cold spells and they preclude the extensive cultivation of all but the hardier varieties of fruit trees. The change from winter to summer is often abrupt and these sudden changes with frequent droughts in summer render Wisconsin climate severe for perennial plants. Lake Michigan affects the climate for a distance of from twenty to thirty miles west of the lake and the climate of that region is about 4° warmer in winter and 5° cooler in summer as a result of the lake's influence.

The hardier apples succeed in the southern and eastern parts of Wisconsin, some peaches, pears and cherries are grown in a few of the eastern counties, and grapes with winter protection are grown throughout southern and eastern Wisconsin when planted in light soil with a southern exposure. A commercial fruit region of some importance in Wisconsin is the Door peninsula between Green Bay and Lake Michigan. In that region cherry growing is becoming important.

The following table gives the number of bushels of fruit raised in Michigan and Wisconsin in 1899 and 1909.

	Mich. (1899)	Wis. (1899)	Mich. (1909)	Wis. (1909)
Total (in bu.)	9.859.862	348.600	15.220.104	2,343,517
Apples (bu.)	8.931.569	303.373	12.332.296	2,232,112
Peaches (bu.)	339.637	209	1.686.586	965
Cherries (bu.)	194.541	31.067	338.945	81,340
Pears (bu.)	170.702	1.540	666.023	12,992
Plums (bu.)	213.682	12,166	181.188	15,907

A SIMPLE AND RAPID METHOD FOR MAKING RELIEF MODELS FROM CONTOUR MAPS

By Leon Augustus Hausman
Physiography Laboratory, Cornell University,
Ithaca, N. Y.

IN teaching physical geography it is the common experience of instructors that nearly all pupils find difficulty in comprehending contour maps. Hence any means that will facilitate a positive interpretation of the details of the relief as shown on the contour map can not fail to be of great help in leading to an intelligent reading of such maps. Particularly is this true if the home region can be studied in such manner, for the pupils will all be more or less familiar with its topography and consequently will be more than ordinarily interested in its graphical representation.

The construction of a relief model of course immediately suggests itself as the solution of the difficulty. But two objections to such an attempt are encountered almost at once. If the modelling is done on a sand table the forms produced will be so crude and inaccurate as to be unrecognizable. If, on the other hand, an exact reproduction is attempted, the amount and kinds of material needed, the technical difficulties, and the skill and extent of the labor involved make the work altogether impracticable for secondary school pupils, if the usual procedure in making such models is followed.

In connection with some work that involved the construction of a number of models of small size, a method for making these rapidly and accurately was devised by the writer in the Physiography Laboratory at Cornell University. The procedure is so simple and the materials required so inexpensive and easily procured that their making seems quite feasible for pupils of secondary schools. The scheme is accordingly presented here in the hope that it may be adopted by others and that it may lead to a clearer understanding of topographic maps by students of physical geography.

The essential materials and implements are:

1. a pantograph (the wooden form is much cheaper than the metal one, and for this work, just as satisfactory)
2. a wooden rolling pin
3. a drawing board
4. Plasteline, five to ten pounds *

* This is a composite modelling clay and may be obtained from A. H. Abbott & Co., 127 N. Wabash Ave., Chicago, Ill., at a cost of from twenty to twenty-five cents per pound.

5. plaster of Paris, five to ten pounds.

If the topographic sheet for the home locality has been issued by the U. S. Geological Survey, the greatest interest can, without doubt, be secured by making the first relief model a reproduction of the part of this sheet adjacent to the school.

As a great majority of the contour maps that have been issued are on the scale of one inch to one mile, it will immediately be apparent that in order to show the region about the school for four or five miles in every direction it will be well to have the horizontal scale twice or three times as large as that on the map. The pantograph is accordingly set to enlarge to the desired size and a sheet of rather heavy, smooth, white paper firmly affixed to the drawing board, at the points determined by the adjustment of the pantograph, by means of thumb tacks. The section of the contour map desired for reproduction is fastened in the same way. Before beginning the work it will be worth while to give consideration, first to the degree of relief presented by the region to be modelled, and second to the extent to which it is proposed to exaggerate the vertical scale. If the region is one of say four or five hundred feet difference in relief within the area to be modelled, it will probably suffice to trace out (as described below) only the hundred-foot contours. If, on the other hand, the region is one of very low relief, where, for example, five-foot contours are used on the map, it may be necessary to trace out every ten-foot contour line in order to reproduce the slopes with accuracy.

The vertical scale will, in any event, undergo exaggeration, hence it should be the aim of the modeller to keep the exaggeration as slight as possible, and yet give an adequate notion, in the finished model, of the actual relief. Consideration must also be given to the thinness to which the Plasteline can be successfully rolled, probably about one-eighth inch will be found as thin as can be readily handled.

Trace over and enlarge, on the white paper, the lowest contour line on the area to be modelled, and cut this out evenly with scissors. Next, roll out a sheet of the Plasteline about one eighth of an inch thick. This is best done roughly with the palms of the hands and then smoothed out with the rolling pin. Lay the paper outline of the enlarged contour, that has just been made, on the sheet of Plasteline and cut the latter into a replica of this paper contour. Fasten this to any suitable board, and the model is begun, as shown in Fig. 1. Trace and cut the paper for successive similar contour intervals, reproducing them in sheets of Plasteline, and build up the model in steps or terraces. This will result in a land form of some such appearance as that shown in Fig. 2.

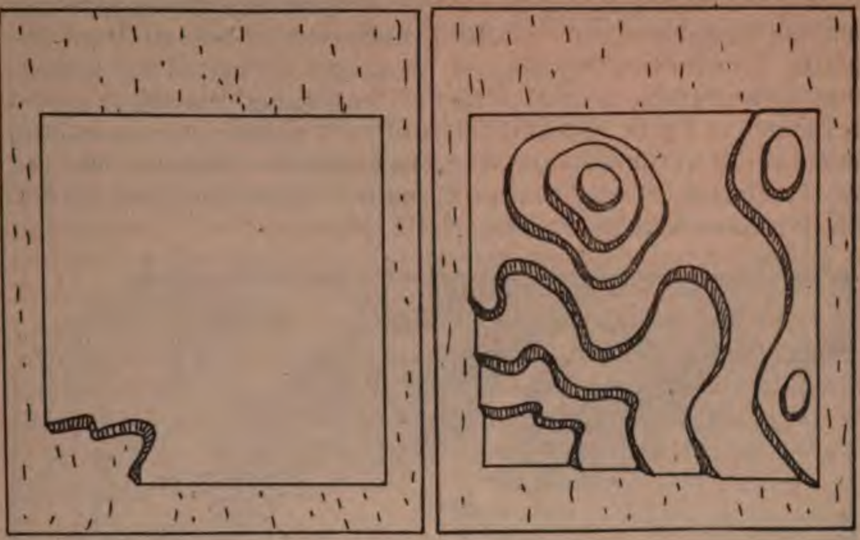

Fig. 1 Fig. 2

Fig. 1. Board with first contour of Plasteline in place.
Fig. 2. Model Built up in Terraces.

The model having been built up to the highest contour in this way, it remains only to reproduce the topography of the slopes between the terraces as determined by the intermediate contours of the map. This is best done by hand. Great care should be exercised to duplicate all the details of the topography. This work of smoothing out the slopes must be done with the original contour map before the modeller, and he should continually be comparing it with the model. In this endeavor to interpret and to reproduce the details of the topography of the region will be found one of the most valuable educational factors of the scheme. Fingers make the best modelling tools for such work, though there will always be deep valleys and ravines that will require the use of some such simple implement as a blunt spatula whittled from the end of a penny ruler. For very deep ravines and gorges a dull pencil will serve. The surface of the Plasteline must be rubbed quite smooth and glossy with the balls of the fingers before the model is ready for its final detailed sculpturing.

If only a temporary model is wanted, no further manipulation is necessary. The original Plasteline model will in some cases answer every purpose, for it may be satisfactorily painted; rivers, lakes, and cultural features put on in their proper places and in the colors of the contour map. But as the Plasteline is mixed with oil to insure its permanent plasticity, the paint will

not dry out thoroughly and in the course of a week or two may become discolored, due to the penetration of the oil from beneath. It is better, therefore, if the model is desired for permanent preservation, to make a cast of the original Plasteline model in Plaster of Paris. Making casts of such simple objects as land forms is not at all difficult. For directions the reader is referred to: Frederick, F. F. "Plaster Casts and How They are Made." (W. T. Comstock, 23 Main St., N. Y., $1.50.)

Fig. 3. Completed Model.

If it is desired to photograph the model for reproduction, this is best done by photographing merely the top surface, cutting this out and mounting it upon a base drawn in India ink, as shown in Fig. 3.

Miss Mary J. Booth of the Charleston, Ill., Normal School, the compiler of the valuable lists of geographic material which may be obtained free or at small cost, that have appeared from time to time in this Journal, has volunteered for Red Cross service in France and will soon leave this country if she has not already done so.

TEACHING INDUSTRIES IN THE PHILADELPHIA SCHOOLS

By W. M. Gregory
Normal School, Cleveland, Ohio

A VITAL part of school geography is the study of the local problems relating to climate, soils, resources, products and industries. The geography that gives children broad generalizations of foreign lands and a very meager understanding of their own locality is a failure. In these times of conservation a knowledge of the extent and possibilities of our own local resources is a necessary part of everyone's education. The teachers would readily use more of this concrete material if it were available. The material that is required must be explanatory of the local geographical conditions that control the industries and other activities.

For a long time it has been customary to begin geography in the grades with some local studies, but these attempts, as they must be at this age, are introductory and do not supply the understanding of local conditions that children ought to have when they leave school. In the last years of the grammar grades, the state supplement is used to supply the local material. The supplement is a condensed mass of geographical facts that has been hitched to our texts largely from a commercial point of view. Its lists of towns and the lack of local material render it unsatisfactory for this purpose. In some states the geological surveys have issued educational bulletins. These are written by specialists in a style frequently beyond the common reader and school pupils. The state bulletins that are used to spread agricultural information in the schools might well be studied by those who believe children should have more contact with local geographical resources.

In many cities there are organizations outside of the schools that are interested in promoting a study of the locality. The chamber of commerce, the commercial club, the geographical society, the woman's city club, the industrial bureau, the city club, and other similar organizations, can all be convinced of these needs of schools, and such organizations will frequently provide very generously for the expense necessary in printing and distributing such material.

Philadelphia

This brings us to what has been done in Philadelphia to aid the study of local industry in the schools. The educational com-

mittee of the Philadelphia chamber of commerce is responsible for a series of Educational Pamphlets that are issued and presented to the schools of Philadelphia. The object of this series is to make Philadelphia's "life, industry, history, and government known, understoood and appreciated by all its citizens." If the citizens expect the schools to bring these vital ideas to the pupils, then the various local organizations must co-operate in the effort. The teacher can modify the course of study and adapt the materials to the work of the schools, but it is necessary that those who know the industry at first hand should have a large part in the collection of the subject matter to be used.

The chamber of commerce of Philadelphia has certainly made an excellent beginning in preparing material for pupils to study home industries. Each industry is discussed in a small pamphlet of about fifteen pages. The illustrations are clear and each one has its story. The statements are clear in their explanations and full of interest. The educational committee has invited various large industrial concerns to prepare and print these pamphlets. The expense of the printing is born by the various companies concerned. The wide distribution of the local studies among the teachers and pupils is a most important factor in the success of home studies. It is the duty of those who would promote a greater interest in their own locality to provide the money for printing a large quantity of small and cheap pamphlets which must be widely distributed. The success of home study in a city depends upon this part of the campaign.

Following is a list of the Philadelphia publications that have been issued thus far:

1, Thrift—a short text-book
2, The Trust Companies of Philadelphia
3, The Rug and Carpet Industry of Philadelphia
4, The Locomotive Industry in Philadelphia
5, Truck Farming in Philadelphia County
6, Candy Making in Philadelphia
7, The Leather and Glazed Kid Industry in Philadelphia
8, Milk and its Distribution in Philadelphia
9, Telephone, Telegraph and Wireless Systems in Philadelphia
10, The Manufacture, Distribution and Use of Gas in Philadelphia
11, Department Stores in Philadelphia.

The teacher of geography in Philadelphia finds in these pamphlets a source that can be used by the pupils. Through this material the pupils come to know more of their own city and have

an interest in the present problems of transportation, communication, and industries. The above list is not without its defects from the standpoint of geography, but it is a splendid beginning along the right lines.

If your students had more local material available for such studies, the school courses in civics, industries, and geography would have a greater interest and more practical results. The writer is anxious to learn what your community has done to bring a knowledge of local geography to the schools.

A REQUEST

If you will communicate to the writer what your community has done, the various methods employed in all parts of the country will be compiled and published in the Journal of Geography. The results ought to contain some ideas and plans that will be valuable to your community. If we could have a large response from many parts of the country, a comparison of plans would be an incentive to increase local studies.

SOME ASPECTS OF THE STUDY OF GEOGRAPHY WITH SUGGESTIONS FOR ITS PROMOTION

By Warren D. Smith,
University of Oregon, Eugene

"THE sun and the moon, the right eye and left eye of all History, are Chronology and Geography."—Hakluyt.

Some of the readers of this article may have read the indictment of college students in the Nation of December 16, 1915. A freshman class was reading Marlowe's "Hero and Leander:" "Hellespont suggested Gallipoli, and I, (a professor in a Middle Western University), asked the class—it was quite a chance shot —where Gallipoli is. To my surprise, no one knew. I wrote the word on the blackboard, and was amazed when the class confessed that not one had ever seen the word before!

"Within the next twenty-six hours I had met three other sections of freshmen, and had placed 'Gallipoli' before them, with the same result. A more advanced course yielded two men who had never heard the name—one of them was on the staff of the university daily paper."

The matter of Gallipoli is bad enough, but imagine the writer's chagrin on finding but one in a class of forty, in Geography, who knew by name the scene of the greatest naval engagement in modern times. A junior in the University informs the class that the Danube is in India, while another one says that Babylon

is one of the large emporia (at the present time, mind you) of the Mesopotamian region.

Let me say that this indictment must not be leveled at students alone. Some teachers and others the writer knows of, were avoiding the study of the geography of the war under the pretense of being absolutely neutral. This is as bad a confession of weakness as that of the man who has to take a pledge to keep decent. Laziness will explain a good deal of this. And so we'll give the poor, much maligned students a rest and pass to bigger game.

A New York business house instructs its *Havana* branch to settle a certain matter with some people in Manila (thinking the latter place somewhere in the Caribbean). A wealthy woman of Fresno, California, is overheard on the S. S. "Manchuria" telling a friend that she and her husband are going "first to Manila and then take the train from there to Shanghai!"

How long are we going to merit the implications in the Nation? One fundamental difficulty in all our dealing with foreigners, whether Europeans, Mexicans, Japanese or Filipinos, can, in our opinion, be shown to be due to lack of knowledge of these peoples and therefore of geography. We do not seem to get their viewpoint at all. A world view point is needed. Now how can you expect the student to get it if many high officials of the land and the teachers haven't it? Our dealings with Japan, Mexico, and Europe in general would be made vastly easier if we personally knew these countries and their peoples better than we do. Most of the trouble in the world has come about through misunderstanding, either intentional or unintentional. The first has usually to be overcome by force, the second by education.

When the writer came to the University or Oregon three years ago as professor of Geology, he found that there were no courses in anthropology, ethnology, or geography, and he has since found that there is little or no geography taught beyond the grades in Oregon schools, save a little physical geography and that, through lack of inspiring and well trained teachers, is in its death throes. It is only fair to say that there are several schools where no fault could be found with the teaching of this subject.

Now geography is a great synthetic subject, a fine melting pot for so many interesting facts and principles drawn from both the sciences and the humanities that it ought to be one of the most popular and profitable courses in the school or college curriculum. The writer, whose first love was geology (and for this subject he still feels a great attraction), finds himself in these times of momentous world changes irresistibly drawn into a

deeper study of geography. He instituted a course in Advanced Economic Geography at the State University three years ago with the following enrollment: the first year 22; second year 35; third year 42 (fifteen or twenty were turned away as the lecture room would accommodate only about forty). He hopes in time to see courses in Ethnology added. These are not theoretical studies,—they are immensely practical. How can the American business man market his products abroad if he does not have salesmen who know the countries in which they expect to travel, or if he himself does not know what those people want? Germany's success in foreign commerce has been in no small degree due to this sort of training.

Constructive Suggestions

Having consumed some time in fault-finding, let us proceed to something constructive. There are two parts to this plan, the first part of which has been published by the National Council of Geography Teachers, and the second part is submitted by the writer. However, before submitting these proposals, we wish to offer a few suggestions to the teacher of geography who may not have access to the best libraries or who has not seen much of the great world beyond the boundaries of his or her state. The writer makes no pretense at being an authority, but he has found that extensive travel in foreign lands and association with leading geographers at the headquarters of the Royal Geographic Society in London has furnished him with a perspective and a kind of information which he personally has found of the greatest help. His desire is to aid those less fortunate in this respect, as well as to criticize.

What are the qualifications for a successful teacher of this subject? We don't know positively, but we may venture to state some of them (if some of this is old matter and has been said before, it won't do any harm to repeat it here):

First, enthusiasm

Second, wide reading in geographic literature

Third, broad training in the fundamental sciences

Fourth, ability to associate facts and to make deductions

Fifth, (if possible) wide travel, and actual first-hand acquaintance with various peoples in other lands. There are many good books, but none can impart a knowledge of temperament, sympathy for strangers, etc. These can be gained only by personal contact. A speaking knowledge of a foreign language is of tremendous help.

Methods: One word will convey most of what is essential in this paragraph: VISUALIZE: and do this by means of

1. Pictures
2. Maps
3. Graphs.

A second point,—make the oceans and not the continents the "turning points." Oceans unite, they do not separate the continents in these days. There is more in common, in many ways, between the east coast of Asia and our west coast today than there is between the eastern and western shores of our own continent, and this will be accentuated with the passing years.

A teacher cannot be the best teacher unless he has done, or is at present engaged in, some sort of individual research. Only in that way can he get the feeling which actuated the early discoverers of new lands—the makers of geography. The research men in our colleges and schools are our modern explorers. Exploration is intensive now, instead of being extensive, but it is exploration just the same.

O. Henry, in his inimitable way, has said that "all the world is divided into two parts: men who wear rubbers and pay poll taxes and those who discover continents. There are no more continents to be discovered, but long before the supply of rubber has given out these same men will be paralleling the canals of Mars with radium railways." And we might add that although all the continents have been discovered, not all the valuable facts about these continents have been discovered. Are you, reader, going to be a mere "middle man" in the world or do you care to take a part in the gathering, at first hand, of knowledge?

Equipment: First, let it be said that expensive apparatus is not imperative. A good atlas, a daily metropolitan paper, maps which can be had for nominal prices, relief maps, which you can make yourself, a good collection of pictures, (post cards if you can afford nothing better) and you have the essentials. Below is a list of equipment in the laboratory of the University of Oregon used in this subject. Where funds are available these are very desirable.

Tellurian
Relief maps of the world, U. S., and of the home state
U. S. Geological Survey topographic maps and folios
Materials for relief map making
The Shaler-Davis Physiographic models
About 1000 lantern slides
The Black & Co. Geographic illustrations, etc.

Atlases, press bulletins of various government institutions, newspapers, etc.

Now to return to our scheme:

First, as to the National Council's proposal—as concisely stated in the bulletin of the Illinois Geography Society:—

For several years many teachers of geography throughout the country have hoped for a working organization to promote greater interest in the study and teaching of geography. In July, 1914, a group of geographers, who attended the science section of the National Education Association in St. Paul, planned for the organization of a National Council of Geography Teachers. Mr. George Miller, of the Mankato (Minnesota) Normal School, was made chairman of the inaugurating committee and pushed the work of organization through extensive correspondence.

The plan worked out by this committee was presented to the Association of American Geographers at their annual meeting in Chicago in December, 1914, and met with their hearty approval. The final plan of organization of the National Council of Geography Teachers was worked out at the meeting held in Washington in January, 1916.

The annual membership dues of the National Council are one dollar, which includes subscription to the Journal of Geography, the official organ of the council.

Organization of State Council

The inaugurating committee of the National Council urged the growth of the organization "for the purpose of increasing the interest in geographic education and of promoting better geography teaching." In order that the many teachers of geography throughout the states be brought into closer touch with the movement, they proposed the formation of State Councils of Geography Teachers. The committee suggested that the "chief purpose of the state council shall be to promote better geography teaching in every way possible, working through existing teachers' associations,—state, district, county, etc. It is expected that the teachers of geography in a single state will (1) meet in connection with existing organizations; (2) get speakers on geography for the program of all teachers' associations, thereby directing attention to it and awakening interest in the subject; (3) assist school officials in organizing geography in the elementary and high schools in accord with the modern conception of the science; (4) encourage the preparation of papers on geography teaching for local and national educational journals."

Chairman Miller appointed leaders in the various states who

set about planning organizations to carry out the splendid ideas initiated by the founders of the national movement. The work was taken up with such zest by geographers throughout the United States that by May, 1916, leaders in thirty-eight states were at work and sixteen state leaders had completed the organization of their state councils. Great enthusiasm has been manifested and many valuable programs devoted to geography have been given by the state councils.

CUBA

AN excellent geographical position and abundance of natural resources has earned for Cuba the title, "The Pearl of the Antilles." Though somewhat smaller than Wisconsin it would, if properly placed, reach from Chicago to New York. In climate and resources the island is often likened to Java. However, in density of population they present striking contrast, the population of Cuba being about equal to that of Chicago, while Java has some 30,000,000.

The island lies at the entrance to the Gulf of Mexico, and trade routes from our Atlantic seaboard or from Europe to Caribbean countries find Cuba on their direct route, and now that the Panama Canal is open and focussing still more lines of traffic through this region, the island should find itself supplied with the best of export facilities.

To most of us Cuba is synonymous with sugar and tobacco. As a matter of fact these form 90% of the total exports in value. The island ranks second as a world's cane sugar producer, India being first. Beginning in the vicinity of Havana, the sugar plantations have spread eastward, new lands being taken up as the old soil became exhausted. The plantations are mainly in the hands of Americans and Europeans, and because of their great size they have their own railways to carry the cane to the sugar mill. Lying within the tropics, Cuba is frost free and the annual replanting of cane practiced in Louisiana is unnecessary here. The only cloud that hovers on the horizon of the sugar industry in Cuba is the beet sugar competition and the scarcity of labor. With the present war cutting off the export of beet sugar from Germany, Cuban sugar stock is booming. Cuba's entrance into the war is not only in accord with her political affiliations with the United States, but with her economic interests as well.

Cuban tobacco and "Havana cigars" are famous the world over. As sugar is the main crop in the eastern portion of the island, so tobacco has come to be grown mainly from Havana

westward, the best quality being produced on the south slopes of the ridges in the westermost province. The cause of the superiority of this tobacco has always been a puzzle and attempts to raise the same variety elsewhere have failed. The city of Key West, built largely by Cuban cigar manufacturers, affords an interesting example of tarriff control. In order to avoid the heavy duty on imports of manufactured tobacco goods, the tobacco is shipped to the nearest point in the United States, about one hundred miles distant, and manufactured there as Havana cigars.

W. O. Blanchard.

THE BERMUDAS AND THEIR ONION INDUSTRY

WHAT does the word "Bermuda" suggest? If we look in an atlas we can find this is the name given to a group of coral islands in the west Atlantic, about 700 miles southeast of New York. About one-half their population is composed of blacks, who are the ordinary servants and manual laborers, while the rest of the population consists of Portuguese, usually employed as tradesmen, farmers, etc., and English, who make up the ruling class. But of possibly more interest than this is the fact that the widely known onion which we prize for its mild flavor, and which bears the name of Bermuda onion, is cultivated upon these islands.

For scores of years, the inhabitants of Bermuda experimented with onion seed to get a variety which would produce a bulb of mild flavor early in the spring, when our domestic onion is too strong for use in its raw state. Seeds from onion fields of Egypt, and from Spain, whence thousands of crates are shipped annually to European and American markets, were taken to Bermuda, but none produced just what was desired. Finally, the experimenters went to the Island of Teneriffe, off the coast of Africa, where the natives grow an onion which was found to fulfill the requirements. It was found necessary to import the seed every year from Teneriffe in order to get the desired results; for something in the condition of the Bermuda soil affected the onion so that its seed would not produce the juicy, mild bulb that the fresh seed from Teneriffe produced.

This species of onion must have a warm, almost frostless climate. Since the temperature in Bermuda ranges from sixty to seventy degrees in winter, and is seldom above eighty in summer, this is the ideal spot for the onion's growth. Small patches of ground, many not more than one-fourth acre in size, are cleared on this coral formation for planting the seed. Each

square foot of ground accommodates a half dozen bulbs. The first crop, which is planted in November and harvested in February or March, is not of such a fine quality as the second crop of April or May. These onions are packed in crates and shipped to our eastern ports for distribution throughout the country. Up to 1903, this was the only onion that could bring a high price in the American markets. Then a man in Texas discovered that by planting the Teneriffe seed in favorable places in Texas, he could obtain almost as good results as were obtained in the Bermudas. He called his onion the "Texas Bermuda," and it has become an active competitor of the ones from the Bermuda Islands. However, it is said that the coral soil of these islands gives a distinctive sweetness and mildness to its onions which has not been duplicated upon other soil.

HELEN LOUNSBURY.

JAMAICA THE ISLE OF BANANAS

WITH the completion of the Panama Canal the traffic routes between the West Indies and the coasts of the United States have been shortened and the traffic from these islands is becoming of greater importance. A new commercial era is dawning on these islands as they tend more and more to concentrate on the production of a few tropical products. Jamaica's industries were almost paralyzed until she found relief in the raising and exporting of bananas. Abandoned sugar estates were turned into productive banana plantations. Jamaica now stands at the head of banana-producing countries both in quantity and quality. Her exports in 1916 were valued at almost four million dollars.

The banana tree attains about twenty feet in height, and with its long, broad, gracefully drooping leaves is exceedingly beautiful. It is not difficult of cultivation and the plant bears fruit, one bunch in twelve months, when it gives way to its successor, springing from the same roots; which process may continue for several years. Bananas are set in avenues, sometimes, irrigated, according to the character of the district, and run from two hundred and fifty to three hundred and fifty plants to an acre, with a gross yield of fifty or seventy-five dollars. The banana is also used a great deal as food for the inhabitants. The fruit is never allowed to become ripe on the stalks; its degree of ripeness when cut depends on the time for transmission to the user. The standard "bunch" of commerce has nine "hands" of twelve bananas each. As only one day is allowed between cutting and shipping, the greatest activity prevails on the days when ships are receiving cargo.

The industry is carried on with increasing activity from year to year, for the prosperity of the island practically depends upon the banana industry. When prosperity in the banana industry reached its height a few years ago, the growers suddenly realized that the market and prices were controlled by a powerful trust which reaped a large part of the profits. Some idea of this may be gained from the fact that for a bunch of one hundred bananas the planter in Jamaica receives only an average of twenty cents, or one cent for five bananas, after his labor of cultivating and hauling the fruit to the ship's side.

MARGARET SENNETT.

A NATION THAT GERMANY OVERLOOKED

FEW people realize that in this modern day there still remains tucked away in central Europe a remnant of Mediaevalism; it is Liechtenstein, an independent principality in the Alps, bordering on the upper Rhine. To the east is Austria and across the river is Switzerland, and the German frontier not many miles away. This miniature state is twelve miles long, and is about 68 square miles in area. It is squeezed into a narrow valley between the mountains and the Rhine. It is so narrow that "one thinks of Mark Twain's jibe in regard to the kingdoms of Joshua when 'people had to sleep with their knees pulled up because they couldn't stretch out without a passport.' He could have said that in Liechtenstein, people have to sleep lengthwise of the country." * The valley is flat-bottomed and fertile. The mountain streams yield water power, and are so swift in spring that a dike is built to prevent the valley from being flooded.

Back in Roman times a Roman camp was located on this site. During feudal times it passed through many hands and in 1700 it was bought by the family of Liechtenstein, of Lombard descent. In 1719 the principality of Liechtenstein was formed and made up part of the Holy Roman Empire, and later of the German Confederation (1815-1866). Between 1806 and 1815, and since 1866 it has been a sovereign state. During the war between Prussia and Austria, (1866) Liechtenstein allied itself with the latter and sent an army of 80 soldiers. The war ended, however, before they arrived. In the peace negotiations, Bismark evidently forgot this little state and it was never accounted for in the general reorganization. Consequently it has remained independent, and retains a prince as its ruler.

The government is really a paternal despotism. The prince

* Shackelton, Ernest, "Unvisited Places of Old Europe."

has given his subjects a constitution which provides for a parliament of 15 members, 12 elected and 3 appointed by himself. They seldom oppose the wishes of their ruler except with a polite protest. The prince is one of the rich men of Europe and owns over 2,000 square miles of estates in Germany and Austria. His principality of 68 square miles and 10,000 people forms more or less of a pastime for him. He is absent much of the time from his castle in Vaduz, the capital, a city of 1100 people. In his absence his personal representative, the governor, with an informal cabinet, takes charge of the governmental affairs.

Liechtenstein has no national debt and no army or compulsory military service. The people pay a nominal tax for the upkeep of the Rhine dike. A small revenue from customs helps to pay the state's expenses. The prince pays a very large tax and sees to the upkeep of practically everything. He takes pleasure in giving generously to his people and allows them great liberty. From his mediaeval castle on the cliff above Vaduz he can see his whole domain.

Liechtenstein has one court of law with appeal of first instance to Vienna and in second instance to the Austrian superior court at Innsbruck. The country has coins and stamps of its own, but it also uses Austrian coins and stamps, and it is combined with an Austrian province for custom house administration. In 1866 the people decided that the keeping of an army was too expensive; since then men from Austria and Germany, wishing to escape military service, have gone there. Immigration was increasing so fast that they had to put a stop to it. Even now there are more men than women in Liechtenstein.

The people are all peasants and live in almost Spartan simplicity. Even the members of parliament cut their own wood. Nevertheless, they have modern conveniences such as telephone, telegraph, and electric lights. The little state is so nearly self sufficient that if it were entirely cut off from outside communication the people could comfortably exist.

The prince and all his subjects belong to the Roman Catholic church. For purposes of worship he has erected two cathedrals in Vaduz. He encourages education from the kindergarten up. The people speak a softened form of German, which incorporates some words of Latin origin; French, however, is taught in the schools. This tiny country, practically unknown to us, is one of the most peaceful and happy of states. There are no poor except the sick and decrepit, who are provided for by their neighbors; and there are no rich to envy. These simple, intensely loyal people do their work and carry on their government with just as much pride as their larger and at present less fortunate neighbors.

F. W.

OSTRICH FARMING IN SOUTH AFRICA *

IN times past the two-toed ostrich ranged over all the habitable parts of the continent of Africa, and extended into Arabia, Palestine, Asia Minor, and probably as far as southern India. In recent times, it has become practically restricted to Africa, a hardy "left over" from a more ancient fauna, in which brain power counted but little. The plumes were obtained from the hunting of the wild bird, and so valuable are they that the creature would have become extinct ere this had not its domestication been undertaken. As it is, ostriches in South Africa have rapidly increased under farming conditions, until in 1913 they were estimated at near 1,000,000, a noteworthy instance of an animal saved from extinction and increasing greatly in numbers through man's agency.

For generations the Arabs and natives of North Africa have kept the ostrich in captivity in small kraals, and ruthlessly plucked its feathers. These birds are captured as chicks from the nest of the wild bird. Under suitable management the bird proved itself amenable to the restraints of farm life and bred freely, and in a short time ostrich farming became one of the leading pursuits of parts of Cape Colony. In 1913, the year before the beginning of the World War, the industry reached its zenith, when feathers to the value of $15,000,000 were exported overseas, mostly to Europe and the United States.

Although the ostrich is indigenous to Africa, it has been established that the domesticated bird will thrive and reproduce under varied conditions, and the remunerative nature of ostrich farming has led to its introduction into other parts of the world, particularly Arizona and California in the United States, and also Australia and New Zealand. The plumes produced in these parts are, however, by no means the equal of those grown in South Africa; and, as the bird is farmed only for the feathers it provides it seems doubtful whether the industry can be made a success beyond the confines of Africa, especially since the exportation of birds is now prohibited by the Union Government. As in so many other highly specialized animal and vegetable products, peculiarities of soil, climate, and the general environment have much influence upon ultimate success; and even in ostrich areas in South Africa great differences obtain in the degree of plumage perfection attained.

Unless the bird is maintained in the highest nutritive condi-

*Excerpted from an article by J. E. Duerden, of South Africa, in the American Museum Journal, Oct. 1917.

tion throughout the six months required for a feather crop to grow and mature, the character and quality of the plumage suffer. Any imperfection of growth greatly depreciates the plume in value, often to the extent of one-half or three quarters. The longest plumes have a growth at the rate of a quarter of inch a day. It can be safely said that no animal is so highly cared for and leads such a pampered existence, as the high-grade domesticated ostrich. The farmer, however, has no option in the matter. The difference in returns from a perfectly grown, high quality feather crop and one defective in growth is often the difference between prosperity and failure.

The first clipping occurs when the chicks are six months old, and all the commercial feathers, technically called spadonas, are removed. Two months later the second crop of quills can be drawn, and the third feather crop starts its growth, to be completed by the time the bird is two years old. The third clipping usually represents plumage maturity, that is, it is the best crop the bird will produce. With care and good management, however, little depreciation follows for a number of years.

CHINESE ITEMS

By Walter N. Lacy, Foochow, China.

Population of Chinese Cities

THE Returns of Trade and Trade Reports for 1916 recently issued by the maritime Customs of China, contain some interesting figures on population. The total estimated population for the Republic is given there as 445,873,000. Bashford, in the latest book on China,* accepts the 1910 estimate of the Chinese government as only 331,188,000.

The late estimates of the population of Chinese ports are interesting, too, in that they change the relative rank of certain cities as listed in the latest statistics published in the United States. Of the three most up-to-date geographies in use, all of them rank Canton as the largest port, one of them giving its population as 1,600,000; two of them rank Hankow as second with a population of 820,000—870,000; Shanghai does not appear at all in the tables of one geography, it ties with Tientsin for second place, in one, with a population of 1,000,000, and it is ranked as fourth in another; Changsha, though now given as a port of over 500,000 population, is not included in any of these geographies. Rand, McNally's Pocket Atlas and the World Almanac give similar differences. As these are the sources from which most geog-

* China, An Interpretation; J. W. Bashford. The Abingdon Press, 1916.

raphy teachers would obtain such information, these latest figures and comparisons may be of some interest.

The figures referred to include the following eight ports with a population of 500,000 each, or over:—

Hankow,	1,321,280
Shanghai,	1,000,000
Canton,	900,000
Tientsin,	800,000
Foochow,	624,000
Hangchow,	594,230
Changsha,	535,800
Soochow,	500,000

The Foreign Population in China

The following figures of the foreign population in China are taken from the Trade Returns for 1916 published by the Chinese Customs. Only those countries having the largest number of citizens resident in China are quoted here.

Japan,	104,275
Russia,	55,235
British Empire,	9,099
United States,	5,580
Germany,	3,792
France,	2,374
Portugal,	2,293

"Asia"

Geography teachers who are interested in Asia, and who are really alive to the latest material for their classes, will find the magazine "Asia" of great value. It is published monthly at New York, by the American Asiatic Society. It is well illustrated, and contains interesting, readable, reliable, and up-to-date reading matter on Asia, especially things commercial and economic.

Butter and Milk Used by the Chinese

Butter and milk are not common articles of food among the Chinese. Buddhistic beliefs in the sacredness of the cow may have been responsible for this fact in the past. But the people of some of the cities, at least, are learning the value of these dairy products as food. It is no longer a rare sight in Foochow, for instance, to see a cow at the side of the street being milked where the purchaser can see that the milk is fresh and not watered. And I was surprised the other day to have one-third of my class tell me they used butter in their homes; when asked where they get the butter they replied that it came from the foreign stores—i. e., tinned butter imported from the United States (since the war stopped the French supply) and Australia.

CURRENT MATERIAL FOR THE GEOGRAPHY TEACHER

Substitution of Other Materials for Wood Increasing

TWENTY-FIVE years ago lumber was regarded as almost as much of a necessity as wheat, while today it is steadily being replaced by various substitutes, says a report by the Forest Service on "The Substitution of Other Materials for Wood." Disregarding the temporary effect of the war, with its sudden demand for lumber and its great enhancement of prices of many substitute materials, the report points out the tendency in the long run. Each year more steel, concrete, brick, or tile is being used in places where lumber was formerly employed. This is particularly true in cities where enactment of building codes and the development of new forms of construction have created a demand for more durable building material. Shingles have given way largely to composition and tile roofings, wooden sidewalks have been almost wholly replaced by cement, while the modern skyscraper with its steel framework, and stone, brick, or tile walls occupies the site of some former frame structure. Railroad crossties and mine props are about the only forms of wood which are not affected.

How hard this substitution has hit the lumber business is shown by the Government estimate that the total replacement of lumber in all forms of use is 8,090,000,000 board feet, or 21 per cent of the lumber consumption of the United States in 1915. The rate of substitution seems to be increasing and is now in excess of 500,000,000 board feet a year. Approximately 70 per cent of the lumber cut goes into forms of use whose demands appear to be decreasing. Twenty per cent more goes into strongly competitive fields. In the remaining ten per cent of wood uses, there seems to be a much better opportunity for a larger consumption.

The Russian Port of Vladivostok

Vladivostok, which ten years ago was so little known in the world that it did not even appear in the lists of important cities of Asia, sprang suddenly into world-wide fame when the war shut off Russia from easy maritime access at the West, being the eastern terminus of the Trans-Siberian Railway and Russia's only developed Siberian port on the Pacific. The Germans had made shipping impossible by way of the Baltic. Munitions and merchandise could go across Scandinavia by rail, and the Port of Archangel was open for a few months in the summer. The Russian Government found an all-year port on the Arctic Ocean and

began the building of a long railway to it. But for quick, safe transportation into Russia from the United States, the railway materials, locomotives, war materials, structural steel, machinery, etc., that were bound for the Eastern Front of the war went to Vladivostok and were conveyed six thousand miles by rail across Siberia.

When the flood of American shipments of all kinds of merchandise to Russia via the Trans-Siberian Railway came upon Vladivostok, the harbor and rail facilities were not equal to it and an unprecedented blockade resulted. Ships came in, thronged the harbor, and unloaded on the shore of the Golden Horn. It was impossible to load trains and get them away. Piles of crates, boxes and bales of goods, machinery and perishables, were stacked twenty and thirty feet high. The Russian authorities were finally compelled to issue a notice forbidding the landing of any goods not intended for the government.

At latest reports, just after the revolution, there had been a decided improvement in the operation of the Trans-Siberian Railway. Long trains, hauled by American locomotives, were leaving daily for the West.—[*The Americas.*] L

South American Cordiality Toward the United States

The people of the United States do not seem to have appreciated at its full value, yet, the demonstration that the people of South America are making of genuine and practical Pan-Americanism in standing by us in the war with Germany. They are straining all established ideas of neutrality and taking cordial ways unheard of before in international relationships for showing their feeling of solidarity with us.

Brazil is formally at war with Germany, is putting herself in fighting trim, and so it was not surprising that the Brazilians gave lavish welcome and entertainment to the American squadron under Admiral Caperton on his visit to Rio de Janeiro for two weeks that included the Fourth of July.

Uruguay is not at war with Germany, and it is therefore an event of very important significance to have Uruguay deliberately and formally adopt a resolution and give notice to the world by proclamation of President Viera that the warships of the United States were welcome to Uruguayan harbors notwithstanding the fact of war, because Uruguay takes the position that hereafter, considering the solidarity of the nations of the American continent, Uruguay will never exclude as a belligerent any American nation at war with an overseas power as a result of aggression by

the latter which shall force the American nation to war in defense of its rights. Montevideo welcomed our ships and men as heartily as Brazil had done.

Then the fleet went on to Buenos Aires, and the question arose what the then punctilious neutrality of Argentine would do about it. The Government's invitation had seemed somewhat cold and formal. But Buenos Aires was as lavish as Rio de Janeiro and Montevideo in entertainment. Buenos Aires has over a million and a half inhabitants. Its capitol building, the Government palaces, streets, parks and great business structures were abalze with electric lights and display of the United States and Argentine flags together. The Argentine Government did not see fit to state the new Pan-American policy of Uruguay in words, but if "actions speak louder than words" it made the same announcement to the world by ignoring entirely the formality of requesting the war-vessels to quit the Argentine harbor at the expiration of the recognized period after which the fighting ships of belligerents are expected to leave neutral waters.

The entry of the United States into the war greatly increased the respect of South American people for us and has inclined them to much more genuine friendship for us. The Latin-Americans have seen the menace to them also in the possibility of Germany coming out of the war a victor or free to adopt an aggressive attitude toward nations whose possessions are worth having.—[*The Americas.*]

Wonderful Growth of Commerce

One of the impressive facts of international commerce is that in the past quarter of a century of rapid growth and intensification of industry in the Northern Hemisphere, by which it might have been expected that separate nations would have manufactured everything their peoples desired, the industrialization of the busiest ones has brought the opposite effect. International commerce in 25 years grew nearly ten times as fast as population. In 1914, the trade of the world was more than twice what it was in 1890. The population had grown only a little more than 10 per cent. The production of coal, which may be roughly taken as a measure of the growth of the industrialization of the world, was nearly three times as large. The growth of trade between nations was sufficient to make the average share of every inhabitant of the world in it now twice as great as it was a generation ago.

Probably the most impressive fact of all was that the greatest volume and intensity of international commerce is not between the group of countries largely devoted to manufacture and the

group devoted to production of food and other raw materials, but between the great industrial countries themselves. Just as growth of intelligence calls for a greater exchange of ideas, the growth of the productive energy of civilization calls for an exchange of industrial products, which is another kind of exchange of ideas. With the exception of England, every one of the world's great industrial nations sells more manufactures to other members of the same group, and buys more from them, than to or from the raw-material parts of the world. The great streams of commerce flow between the great industrial countries. The importance of this fact in the future development of political relationships between all parts of the world is due to the enormous war-time growth of new industries in many countries that formerly specialized in production of crude materials. A recent copy of an Australian trade-journal mentions important new enterprises in fourteen lines of manufacture of staple goods formerly imported altogether, such as stoves, baby carriages, kitchen ware, brass foundry, trunks and bags, iron beds, etc., which in Australia are handled by the hardware trade. A new steel works is being established. The same kind of news comes from South Africa, Japan, India, China and South America. We ourselves have greatly expanded our industrialization. If history repeats itself there will be an expansion of world-commerce and an increase in consumption that will take the product of the world's greater production and manufacture.—[*The Americas.*]

ECONOMIC GEOGRAPHY—GENERAL SURVEY

1. In what part or parts of the United States are the following produced in large quantities?
   - (a) *Minerals*—anthracite coal, high grade bituminous coal, low grade coal (lignite), petroleum and natural gas, copper, iron, gold, silver, lead, zinc, salt, sulphur?
   - (b) *Soil Products*—corn, wheat, cotton, oats, flax, potatoes, sugar beets, sugar cane, alfalfa, grapes, apples, peaches, oranges, grape fruit, pineapples, olives?
   - (c) *Manufactures*—cotton goods, woolen goods, shoes, carpets and rugs, men's hats, men's clothing, pig iron, steel, paper, flour, sugar, cotton seed oil, butter and cheese, pottery, jewelry, silk goods, cement, glass, collars and cuffs, meat products, knit goods, automobiles, distilled liquors, ships, farm machinery, naval stores, furniture, maple sugar?
   - (d) *Fishery Products*—cod, oysters, salmon, herrin[g], sponges, seal, mackerel, halibut?

2. Where in Europe are the following produced in a large way: potatoes, sugar beets, flax, rye, wheat, corn, mulberry, olives, oranges, grapes, sheep, goats, dairy cattle, cheese, butter, iron ore, coal, copper, petroleum, potash salts, lumber, cotton goods, ships, silk goods, wine, chemicals, toys, dyes, cork?
3. What countries or regions of the world are the largest producers of coal, iron, gold, wheat, cotton, coffee, tea, cocao, rubber, petroleum, wool, raw silk, wine, tin, copper, diamonds, rice, corn, flax, jute, lumber, cork, olives, potash salts, nitrate of soda, hemp, copra?
4. Practically every country has developed some one or more lines of industry to a notable extent; what industries should be named in connection with Canada, Mexico, Cuba, Hawaii, the Philippines, Ecuador, Peru, Bolivia, Chili, Argentina, Brazil, Uruguay, United Kingdom, France, Germany, Holland, Belgium, Denmark, Norway, Sweden, Russia, Austria-Hungary, Italy, Spain, India, Egypt, China, Japan, South Africa?
5. What great manufacturing industry do you associate with each of the following cities: Minneapolis, Pittsburgh, Grand Rapids, Paterson, Birmingham, Philadelphia, Troy, Fall River, Lowell, Lynn, Detroit, Milwaukee, New Bedford, Trenton, Chicago, Gary, Providence?
6. What are the principal termini of the following railroad systems: Pennsylvania, New York Central, Baltimore and Ohio, Illinois Central, Northern Pacific, Great Northern, Union Pacific, Santa Fe, Southern Pacific, Canadian Pacific, Grand Trunk Pacific?
7. Name and locate 15 important ports of Europe; 8 of Asia; 8 of South America; 4 of Canada; 10 Atlantic ports of the United States; 4 Pacific ports; 8 Great Lakes ports; 5 Mississippi River cities; 4 Gulf ports of the United States.

NATIONAL GEOGRAPHICAL MEETINGS IN DECEMBER

THE annual meeting of the Association of American Geographers will be held at the University of Chicago on Dec. 27-29, 1917. Preceding this meeting, the National Council of Geography Teachers will meet on the afternoon and evening of December 26. President R. E. Dodge and Secretary George J. Miller are preparing a program for the meeting. Further announcement will appear in the December Journal of Geography.

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SUGGESTIONS FOR TEACHING ELEMENTARY GEOGRAPHY

By R. H. Whitbeck
University of Wisconsin, Madison

IT IS extremely doubtful if an agreement could be reached even among geographers themselves, concerning the kind of geographical knowledge or training that is of most value. But there should be no difficulty in determining, in the main, what kind of knowledge is most distinctively geographical, and hence is the particular responsibility of geography. There is no doubt about the kind of material that occupies the middle of the field of geography, but no man living would attempt to say where the outer limits of this field lie.

Knowledge of Location

Knowledge of the location of continents, oceans, countries, cities, important rivers, lakes, arms of the ocean, islands, and the various features of the land, is distinctively the province of geography. Such knowledge is almost wholly obtained by working with maps. Map studies are the most fundamental and distinctive phase of school geography. Aside from a limited amount of map knowledge supplied in connection with history, geography is the one and only study which we can hold strictly responsible for equipping students with map knowledge. Here is one clear and undeniable responsibility of geography, and every geography teacher should say to herself: "I accept this responsibility and I will make it my business to meet it."

Now immediately arises the need of a caution, lest place-geography assume an undue prominence, and we go to extremes as did the majority of teachers a generation ago. The mistake that brought the geography of that period into disrepute was undiscriminating emphasis upon place-geography; far too many places were located. One of the important steps in the teaching of place-geography is the selection of the list of places and geographical features which are worthy of mention, and the much smaller list of those that deserve emphasis and review. Every teacher should have her list of minimum essentials in place geography,—either a list carefully prepared by a committee, or, in the absence of that, one prepared by herself. The new courses of study re-

cently issued by several cities, (for example Detroit and Minneapolis) give such lists. One was also published in the Journal of Geography in May, 1917, a copy of which list can be secured for a two cent stamp.*

Now, since the most distinctive responsibility of school geography it to equip pupils with a reasonable knowledge of location, through map studies; and since the achievement of this in a sane and balanced way requires the preparation of an approved list of places and geographical features, it necessarily follows that the compiling of such a list for each grade and each city is one of the first steps toward securing more satisfactory results in school geography.

Elementary Geographical Ideas

Very early in the study of geography pupils begin to need a knowledge of certain words which in an elementary way belong to the vocabulary of geography. Some of these are not exclusively geographical, but the teacher will do well to be sure that they are understood as fast as a need for them develops. The following list is offered as a suggestion; each teacher will wish to modify it somewhat. Most of these terms will be acquired during the first year of actual geography study—usually the fourth grade. Formal definitions are not needed: an understanding of the meaning of the terms, and the ability to use them correctly are the ends to be sought:

Right, left, up, down, north, south, east, west, the semi-cardinal points, earth, air, sky, atmosphere, soil, wind, land, sea, cloud, dew, fog, a gas, a liquid, a solid, heat, cold, temperature, thermometer, hour, day, week, month, year, decade, century, sun-rise, sun-set, new moon, full moon; village, city, town, township, county, state, nation, creek, river, lake, bay, strait, sea, gulf, ocean, harbor, port, hill, valley, slope, mountain peak, mountain range, mountain pass, island, peninsula, isthmus, cape, plain, continent, shore, and such local features as can be shown; axis, poles, equator, parallels, meridians, latitude, longitude, prime meridian.

Home Geography and the Geography of Distant Lands

)ur courses of study usually start geography with so-called : geography. The practice is based upon sound pedagogy at it utilizes the geographical materials and opportunities at l, and affords the advantage of studying real things, rather

* Address Journal of Geography, University of Wisconsin, Madison, Wis.

than studying about them. Yet, if the first year of geography were confined to home geography, it would prove a dull and disappointing year. Parallel with it must go quite the opposite kind of geography—a study of remote and strange peoples and their lands. There is scarcely a child interest that is deeper than this interest in peoples beyond the sea,—people who live in tents and ride on camels; people who wear wooden shoes, or who drive dog teams, or hunt with bows and arrows. There is a fascination in hearing about the people of China, Japan, India, Arabia, or Mexico;—in fact, about any people whose mode of life is strange, and hence quite wonderful.

Next to children's interest in people across the sea is their interest in knowing where things which they eat, use, wear, or possess come from; how they are obtained or produced, and how they reach us; this applies especially to things which come from far-away lands.

One of the most effective ways of leading up to the study of any country is through a study of some familiar thing that has come from that country. The more fully teachers can make geographical knowledge a means of explaining things that the children have a natural interest in, the more eagerly will children seize that information. The whole geography of the Sahara can be gathered around the story of a box of dates:—the long sea-trip from the Mediterranean, the caravan journey across the desert, the palm groves of the oasis, the dry and thirsty land with its terrible sand storms, the great value of water, the wonderful adaptation of the camel, the robber tribes and their desert code of honor,—all these are inherently interesting.

The story of a banana carries us in a fruit steamer southward into the tropics, to a plantation in Jamaica or Costa Rica, or Colombia, to lands where snow never falls, and even a frost is unknown, where the trade winds blow, where dawn and twilight are very short, and the longest day or night is but little longer than the shortest.

A lead pencil leads us to the graphite mines and rubber plantations of Ceylon; a silk ribbon to the mulberry groves, and the bamboo houses of Japan; a cork to the cork-oak forests of Spain or Morocco; a cube of sugar to the plantations of Cuba; a bar of chocolate to Ecuador, and so on. Every one of these journeys calls the map into use; ideas of distance are acquired, and climatic belts assume significance. Most of this geographical knowledge is greeted with a welcome because it explains things in which people are interested. Thus geography takes on an

aspect of usefulness in the child's world. In the language of the pedagogue, "this sort of knowledge functions in the child's life."

European countries possibly are not quite so interesting as many other foreign countries, largely because the people are more like ourselves, live much as we do and produce the same things that we do. One method of approach to European countries is through finding out the various countries represented by the families of the children. It is not unusual in an American city school to find children representing a dozen foreign countries. Some children can supply information gathered from parents, telling of life in Italy or Hungary or Scotland or Ireland; telling of the journey to America, and other matters, all of which contribute to making geographical studies realistic. The purely bookish quality is removed and maps become useful things.

Such a procedure requires that the teacher have a plan for finally rounding up the knowledge which has been thus gained in a more or less systematic way. In fact, the text book is a necessary supplement to be used parallel with the studies suggested above.

While the ultimate object of geography teaching is to help in producing an enlightened citizenship, the immediate aim is to make people intelligent about the lands and peoples of the earth, and to implant an abiding interest in these lands and peoples—an interest which will reach beyond school days.

Acquiring a Sense of the Common Units of Distance

Ideas of size and of distance as well as of location are an essential part of early geographical studies. There is a difference between knowing distance (for example, that Chicago is 1,000 miles from Boston) and sensing distance. The latter can be achieved by children for short distances only, and even this restricted sensing of distance must be achieved by gradual steps. This is as much an exercise in arithmetic as in geography, and is usually done in an arithmetic class.

1. Learn (by measuring) the size of the class room—length and width and height, in feet.
2. Learn the length of the frontage of the school grounds on the street, in feet.
3. Learn the length of the block in which the school is located (in feet, yards and fraction of a mile.)
4. Select convenient points one mile from school (with school as center and with a radius of one mile, draw a circle on a map of the city or village.) Most of the pupils will find it convenient to walk this distance, timing themselves.

5. Learn the distance between certain selected points in the city or outside; if possible, points with which most of the pupils are familiar. In rural districts, rods and acres will also be employed.

There is an obvious value in knowing certain distances as a means of better appreciating other distances which are frequently mentioned both in and out of the geography class. For instance, a thousand-mile railway journey is mentioned; if the pupil knows that the distance across his state is 200 miles, he can appreciate that a thousand-mile journey is equivalent to crossing five states like his own. The ability to understand distances is helped by having in mind some familiar distance as a measuring stick, such as the width of a state or the distance between two familiar cities. It helps a little to know that Boston is about as far from Washington, or Chicago from Buffalo, as Berlin is from Paris.

6. Know the distance in miles from the home city or village to a few nearby places.
7. Know the length and breadth of the home state.
8. Know the area of the home state in square miles.
9. Know the speed of an ordinary passenger train (say 30 mi. an hr.) and of an express train (say 40-50 mi. an hr.)
10. Know the train time required to cross the home state (use actual time tables.)
11. Know the distance and train time between the home city and the largest city in the region, say New York, Chicago, or Denver.
12. It is worth knowing that it is about 1,000 miles by railroad between Boston and Chicago; between Chicago and Denver; and between Denver and San Francisco: (4 or 5 days between Atlantic coast cities and Pacific coast cities.)
13. It is worth knowing that the sailing distance between New York and England is about 3,000 miles (same as railroad distance between New York and San Francisco) and 5 or 6 days by fast steamer; and from San Francisco or Seattle to Japan, about twice the distance.

There are a few other numerical facts that may be known with profit, such as:

14. The number of pupils in the room and in the school; the population of the home city, state, and the United States (always in round numbers.)
15. The diameter and circumference of the earth.

16. Perhaps the moon's distance from the earth (not quite ¼ million miles) and the sun's distance (nearly 400 times the moon's distance.)

These are, of course, not all to be learned at once, but the first ten will be learned during the first year of geography (4th grade) and the remaining ones later.

Doing as Well as Learning

A fundamental trait of childhood is the love of making things and doing things, and collecting things. This trait is so deep-seated and so universal, that it would be inexcusable not to make use of it if it can be turned to advantage, as it can be in geography. Map drawing and sketching, filling in outline maps, locating cities upon the outline maps, and coloring maps, may all be profitable activities when purposefully directed by the teacher. They are not mere busy-work; they may be just as productive of educational results as any part of the school work. This leads to one of the most distinctive types of work in school geography:

The Using and Making of Maps

No phase of school geography gives more permanent results than working with maps. Facts which we work out with effort —even though the effort is slight—are thereby impressed more lastingly. Moreover, by studying maps, map pictures become impressed upon the mind; and they prove to be about the most valuable legacy we get from school geography.

When we read or think of the Suez Canal or of New Zealand, for example, what mental picture, if any, arises? Not a picture of the Suez Canal itself, which we have never seen, but a recalled picture or map of it. When we pause to think of New Zealand, what do we see? It is a map of New Zealand. Perhaps you live in Massachusetts, or Illinois, or California; yet when you picture your state as a whole, you picture it as the map shows it. The mind can picture the Palisades, or Niagara, or the capitol at Washington, if you have seen them, but no one ever saw a state or country in its entirety, and so he cannot call up a mental picture of it; but he can call into consciousness a map-picture of it. So must it be with all geographical areas of large size.

Map Sketching

Effective geography teaching calls not only for map study, but also for map sketching and map drawing. Text books usually provide map questions. The teacher may use these or not as she sees fit, but to slight map questions is a mistake. Any pupil

who has completed the study of South America, for example, should be able to sketch quickly the outline of the continent, sketch in the three main river systems, show the relative positions of the different countries, locate about ten of the principal cities, and show the situation of such important regions as the coffee belt of Brazil, and the nitrate lands of Chile. Africa is easy to outline; its four large rivers should be known; Egypt and the other Mediterranean countries, the pyramids, the Assuan dam, Cairo, Alexandria, Cape Town, Victoria Falls, and a few other places and natural features should be placed upon the map (from memory) with a fair degree of accuracy. Asia is difficult and possibly not entitled to the amount of drill that would be required to enable pupils to sketch it from memory.

North America and Europe are not easy to sketch, but they are of such importance that the practice necessary to enable pupils to draw recognizable maps of them is warranted. In the case of North America the sketch map should show the position of the Mexican boundary, the Great Lakes, the St. Lawrence River, and the rest of the Canadian boundary; the Mississippi, Missouri, and Ohio rivers; the Columbia, the Colorado and the Arkansas; the Hudson, Delaware and the James; the position of Alaska, Cuba, Porto Rico, and the Panama Canal. Such a map may not be accurate enough to locate cities upon; for this purpose it usually is better to use the printed outline maps if they can be had. On these, pupils ought to be able to locate at least thirty important cities. * In addition, a few locally prominent cities in the home state and in neighboring states may properly be included.

Europe is the most difficult to draw. Before attempting to sketch it from memory considerable practice is necessary with the printed map as a guide. On the map thus sketched, the pupil should be able to locate approximately the boundaries of the several countries, to name the principal coast waters, and to locate the Thames, Seine, Rhine, Danube and the Volga. For drill in placing cities the printed outline map is desirable. **

Map Drawing. There exists some difference of opinion among teachers regarding the value of drawing maps with pains-

* **Suggested list.** Boston, New York, Philadelphia, Baltimore, Washington, Richmond, New Orleans, Cincinnati, Pittsburg, Cleveland, Buffalo, Detroit, Chicago, Milwaukee, St. Paul, Minneapolis, St. Louis, Kansas City, Denver, Salt Lake City, Seattle, San Francisco, Los Angeles, Toronto, Montreal, Quebec, Winnepeg, Vancouver, Vera Cruz, Mexico, and Havana.

** **Suggested list of Europeon cities.** Liverpool, London, Paris, Marseilles, Madrid, Lisbon, Genoa, Rome, Venice, Budapest, Athens, Constantinople, Vienna, Berlin, Hamburg, Rotterdam, Antwerp, Petrograd, and Moscow. A longer list would not be unreasonable.

taking care. Some good teachers do not believe in the practice at all; others approve of a small amount of such work, and a few believe in it heartily. As a boy in school I did a great deal of map-drawing both with and without constructing a net of parallels and meridians. My deliberate opinion is that I profited by the practice; it was thoroughly enjoyable and I am still convinced that it paid. Undoubtedly the amount of time to be devoted to careful map-drawing should not be large, but there seems good reason for recommending that a few maps be drawn to the very best of the pupil's ability; maps in which he takes a just pride when they are finished. We must not lose sight of the fact that pupils find a genuine mental exhilaration in doing a good piece of hand work. It is a form of self-expression which is often a means of materially strengthening the interest of certain pupils in geographical study.

(Concluded in January.)

Prosperous Japan

Never in her entire history has Japan been so prosperous as she is today. Never were her factories busier or the volume of her foreign trade larger. She has taken advantage of her comparatively neutral attitude in the world war and her strategical position in Asia, and has not only almost monopolized the markets of the Far East, but has exerted all of her energy to build up a foreign commerce with every country on the globe. She is sending trade commissions to every land, establishing new steamship routes to Russia, to China, to Australia, to South and North America, to Africa, to Europe, to India, the South Sea Islands, and all the time her shipyards are rushing work on new ships to handle the business when it is fully developed. Japan is progressive, full of energy, and thoroughly alive to the importance of her foreign trade.

Japan's New Experiences With the Cost of Living

The cost of living is constantly rising in Japan while wages remain practically at the same level as four years ago, and the Japanese people are beginning to wonder whether the present period of prosperity is going to be an unmixed blessing after all.

According to the monthly report of the Bank of Japan, just out, the price of commodities witnessed another sharp rise during July. The increase over June amounted to 9 per cent while the advance over the corresponding month last year comes up to 41 per cent. Further, as compared to the pre-war period, viz., July, 1914, the net increase in the price of commodities or cost of living comes up to 66 per cent.

THE FOOD SURPLUS OF SOUTH AMERICA AVAILABLE IN TIME OF WAR

By G. B. Roorbach
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FOR many years the United States held the leadership as a supplier of food to Europe. The greatness of our agricultural resources and the sparseness of our population gave the United States an enormous surplus. With the growth of our population and the development of our manufacturing industries that surplus has steadily decreased. Argentina, Russia, Australia and New Zealand have come to take the place of the United states in supplying to Europe many of the staple foods in which the United States formerly held undisputed sway. Not only this, but in recent years we have witnessed a "carrying of coals to Newcastle." The greatest corn growing nation in the world, we have begun to import corn from Argentina. Instead of exporting large quantities of beef to Europe, our exports fell to insignificant figures, while beef from Argentina and Brazil has been entering our seaports. Beginning in 1909, we imported 193,000 bushels of corn from Argentina. In 1913, this grew to 880,000 bushels, and in 1914 reached the large total of 16,000,000 bushels, falling, however, to 6,500,000 in 1915, and to 2,000,000 in 1916.

In October 1913, Argentine beef began coming to the United States, and in December of that year 9,500,000 pounds arrived. During the year 1914, we received from the River Plate district 160,000,000 pounds of beef and mutton. These imports declined in 1915 to 100,000,000 pounds; and in 1916, to 26,000,000 pounds.

The importations of these temperate zone products into the United States has naturally raised the question of the ability of South America to supply our industrial Atlantic Coast with the products that we have been receiving from our own Prairie and Great Plain States. That we should receive tropical foods, such as coffee, cocoa, and sugar from this continent, three-fourths of which is in the tropics, is expectable, but that South America could send us corn and beef and mutton at first thought is astonishing. Let us examine the prospects of our obtaining foods from South America in the future; first, from temperate zone South America, and second, from the tropic sections.

Grain. The pampa country of Southern South America constitutes one of the finest grain lands in the world. Although at present it is one of the leading grain growing regions, it is estimated that five times the present area could readily be brought

under cereals, and the yield per acre could be enormously increased. The great food crops of the pampas are corn and wheat, with oats rapidly becoming important. Corn in Argentina, unlike the United States, is grown for export, not to fatten hogs and cattle. The result is that although Argentina has less than one-tenth the area in corn that is found in the United States, the country normally exports four times as much of this grain as the United States. In 1913, 55% of the world's total corn exports, amounting to 189,000,000 bushels, came from Argentina. As to wheat, three other countries surpass Argentina as exporters, but in 1913, 110,000,000 bushels, 13 per cent of the world's surplus, came from Argentine farms, and in the same year, 61,000,000 bushels of oats, or 26 per cent of the world's exports. In addition to Argentina, Uruguay and Chili have a considerable surplus of grain for the markets of the world. If needed, can the United States depend upon Argentine grain fields in time of war?

Freight Rates. Let us note, first, that New York and Philadelphia have been getting Argentine grain more cheaply than they could get Kansas corn or Minnesota wheat. The ocean freight rate on corn from Rosario to New York before the war was from 5 to 5½ cents per bushel. This is equivalent to $2. per long ton. Railroad freight rates from Minneapolis to New York are today quoted at 25.8 cents per 100 pounds, or the equivalent of $5.67 per long ton, nearly three times the rate from Argentina to New York. In fact, corn has been shipped from Rosario to New York at about the same rate as the rail rate from Buffalo to New York. Whether or not corn is sent to the United States depends upon whether or not the Argentine exporter can get a better price in New York than in European markets, and this largely depends upon the demand.

Uncertainty of Argentine Crops. As a dependable source of grain supply in time of war, the following points should be kept in mind in regard to South America: (1) The Argentine grain crop, because of climatic variations, is not a sure one. The corn crop especially varies. In 1911, it was an almost total failure, and again last year there was practically none for export. In fact, last year's cereal crop was so poor that on March 27th, 1917, the Argentine government placed an embargo on the exportation of wheat and flour from the country. This in a year of $2. wheat, and when the demand in Europe was never so great.

Demand in Europe. (2) During this world war, the European nations all demand more grain than ever before, and to supply that market, while Russian wheat is bottled up, calls for all the surplus Argentina can produce. Hence, we find that, in

spite of high prices in New York, corn shipments to New York have declined from 16,000,000 bushels in 1914 to 2,000,000 in 1916.

Labor. (3) The labor question, always a serious one in sparsely populated Argentina, is especially so as a result of the war. The coming of the Italian harvest hand, on whom the Argentine farmer has depended, is prevented, and in South America, as in the United States, the manning of the farms is no easy task, and hence the increase of production while the war lasts is difficult.

While the potential producing power of Argentina is very large, in this time of world war, the actual cereal producing power is curtailed, rather than helped, and because of the great demand in Europe, importations into the United States naturally have fallen off.

Beef. The importation of beef from Argentina and Uruguay has been a more recent development than corn importation. The first shipments came in the fall of 1913; in 1914, they reached proportions of considerable importance, representing nearly two per cent of the total beef production of the United States in that year. The reason for this importation of River Plate beef was, of course, due to the great decline in per capita beef production in the United States, the cheapness of producing beef in Argentina, and the perfection of the refrigerator ship. Since 1907, the export of beef from the United States to Europe has greatly declined until now it is insignificant, while Argentina has become by far the most important exporter. Over four-fifths of the imported beef supply of the United Kingdom is now from the River Plate. The number of cattle, estimated at 30,000,000 in Argentina, is capable of large extension. The country is one of the large areas of the world which, because of its climate, is bound to be a permanent grazing land, and should become more, rather than less, important as a supplier of meat to the outside world. This, however, does not mean that during the next year or two the United States can here get large supplies. We have noted already that with the outbreak of war, exports of beef from the Argentine to the United States fell off enormously just as in the case of corn. The demand in Europe is very great, prices are high, the temptation has been to over-slaughter; hence the number of beef cattle has not increased, and it is probable that this coming year Argentina will be able to supply the world with no larger amounts of beef than it did last year, if indeed it can supply as much. It must also be noted that many of the large refrigeration plants in South America are under the control of the big American packing houses. In times of peace, at least, it was not to be expected that [illegible]

houses would send beef to New York or Philadelphia to compete with their own products from their Chicago houses. Whether or not the patriotism of the Beef Trust in time of war will prompt them to any such action, time alone can tell. Past performances do not lend much promise to any such hopes.

Beef in Brazil. A second cattle region that has large possibilities for beef export is Southern and Central Brazil. Already some enormous refrigeration plants have been built in Sao Paulo and other Brazilian States, and big modern cattle ranches have been established, both under the leadership of Americans or American firms. Already Brazil is estimated to have half as many cattle as Argentina. The future of the industry is probably as great as Argentina's. As fast as herds can be increased, transportation facilities created, and refrigeration plants built, Brazil's surplus of beef can be increased.

Beef in Venezuela. A third cattle region of South America is in Venezuela. The great plains of the Orinoco, natural grass lands, could support an enormous number of cattle, within easy reach of New York. They are nearer New York than the Great Plains of our own country, and water transportation would make the freight cost much less than from Kansas City to New York or even from Chicago to New York. But the number of cattle is now small, after the many years of political instability and tropic indifference that has existed in this country. One small English refrigeration plant represents the only development in Venezuela. The future may see this section supplying the United States with meat, but not during this war unless hostilities are very long drawn out.

Tropic Foods. As a supplier of tropic food stuffs to the United States, South America naturally has played a much different role than as a purveyor of grains or meats.

Coffee. Measured in dollars, the largest single export of South America is coffee—valued in 1913 at $259,000,000, ¾ of the world's coffee exports. Of this export, over 2/5 came to the United States, the world's greatest coffee market. This export has steadily grown since the outbreak of the war, rising from 785,000,000 pounds in 1914 to 985,000,000 pounds in 1916, so that we are now receiving more than 50 per cent of South American coffee. The supply of this product from South America can more than meet all the requirements of our nation at war or at peace.

Cocoa. From South America comes 45 per cent of the world's supply of cacao. This food beverage finds one of its largest markets in the United States, and since the outbreak of

the war, our importations have increased from 70,000,000 pounds to 116,000,000 pounds. Some of this has been re-exported to Europe, it is true, but Ecuador, Brazil, Venezuela, and Trinidad can cheaply supply all that is needed in our country.

Sugar. Sugar is a tropical product of unquestionable food value, an absolute necessity. The chief source of our supply lies near at hand in Cuba, which furnishes us with five-sixths of our importations, so that the continent of South America has been of small concern to us as a source of sugar. The coast lands of Peru, Colombia, Venezuela, and Brazil, however, have almost unlimited possibilities of sugar cane production, and under the spur of high sugar prices, new sugar centrals have been built since the war, and our sugar imports from the continent have grown from 44,000,000 pounds in 1914 to 181,000,000 in 1916. This, however, is only a bagatelle in our sugar imports.

Bananas. Aside from these three articles—coffee, cocoa, and sugar—the only other food product from tropic South America of any importance imported into the United States is the $1,000,000 worth of bananas from Colombia.

Will the war cause other tropic crops to come into importance? It does not seem likely. The food producing possibilities of the tropics are enormous, but the population, energy, and organization necessary to develop them are lacking, and cannot be supplied—at any rate not while the energetic nations of the temperate zone are at war. There may possibly be one or two exceptions to this.

Manioc. One of the chief foods of the nations of tropic America is manioc, the substance from which tapioca is made. This is a starchy food, obtained, like the potato, from the tubers of a plant, and equivalent to the potato as a food. Rapidly growing, giving enormous yields with comparatively little effort, it could be made a food surplus for export. In fact, in Brazil there are several factories for the manufacture of tapioca and manioc starch for export.

Rice. In recent years, also, rice culture has been attempted with some success in Brazil and in Peru, but the production to date is insignificant. It is conceivable that with a food shortage in the temperate zone during the war, these and kindred crops might be cultivated for export. The great difficulty is to find sufficient energy and foresight among tropic peoples to do so.

In conclusion, it would seem that the ability of South America to supply the United States with any large quantities of staple foods during the great world war is limited. The grains and meats are demanded in Europe. While they can be brought as

cheaply and quickly to the United States as to Europe, our own supplies make the need less, and it does not seem likely that they can offer us any material aid as long as Europe's needs are so imperative. We are driven back upon our own resources. As for tropic foods, aside from coffee and cocoa, which are not indispensable articles, tropic South America with all its potentialities as a food producer, and although lying at our very doors, can furnish us comparatively little in the way of food supplies. Some sugar and bananas, possibly some manioc and rice, seem to be the limit of tropical South America's contributions to our food problem. Undeveloped even in time of peace, it is difficult to see how in time of a great world war sufficient energy and man-power could be found to solve the great problem of tropic development.

South America's chief contribution to America's food problem must be by indirect means. The *nitrate fields* of Chili, with their invaluable fertilizer, can assist in increasing the production of our own soils. The need of increasing our soil fertility is a vital one and Chili holds one of the keys to our success in the great nitrate fertilizer fields, now so easily reached via the Panama Canal. South America is a large and growing producer of raw materials for our industries. Her wool, hides, rubber, copper, iron, tin, nitrates, are of great importance to our factories —but at present, the United States cannot look to that continent for foods.

The Demand in England for Conscription of Wealth

A great question of national economics which brings up an entirely new fiscal scheme, never before even suggested anywhere in the world, is being discussed everywhere in England, and may develope into a grave political issue. It is the question whether a drastic conscription of British wealth shall be undertaken in order to write off at once the enormous cost of the war so that its burden of debt, with the necessity of heavy taxes for years to come, shall not handicap British industry and enterprise for a generation or more.

The total capital wealth of Great Britain is estimated at from one hundred to one hundred and forty billion dollars by men who are taking part in the discussion, and it seems to be agreed that a levy of 10 to 12½ per cent. on every kind of property, if it could be done practically, would pay off the war debt, which they say would amount to about fifteen billions if the war should end quickly, requiring, roughly, a billion dollars a year for interest payments alone, in addition to other taxation which they say would bring Great Britain's annual requirement of taxation up to $2,500,000,000 a year.

THE USE OF GEOGRAPHIC MATERIALS

By Robert M. Brown
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MANY lists of supplementary materials for teaching geography have appeared during the last few years and if the value of these lists may be determined by the reaction of the teachers, the conclusion is inevitable that they are among the most valuable of recently published papers. There is a strong and almost uncontrollable instinct, under the stimulus of the "free or at small cost" phrase which is appended to many items in the lists, to send for the pamphlets, railroad folders or educational exhibits. If these are useful appliances, the teacher adds a new enthusiasm to her work and, however slight the task has been, acquires a broader outlook for her teaching. But, frequently, a hoarding spirit prompts the request and a lack of discrimination in the selection of materials fills the school room with an unusable array of truck.

In view of the generosity of manufacturing establishments througout the country in furnishing educational exhibits to the schools and of transportation companies in distributing their pictures and literature, is it not well for the teacher to cooperate in this beyond the position of a mere recipient? There is the attitude that the teacher pays back to the distributor a bonus in the way of advertising but this, however true it may be, does not justify here in receiving; for the object of her incumbency is teaching not advertising. If, as is likely, her work is confined to a single grade, then the limits of her work are outlined for her. She should not attempt the work of higher grades and she should be protected from the encroachments on her work by the teachers of the lower grades. The continual and persistent progress of any curriculum of geography should be recognized and promoted. It is a waste of time to teach from the same silk exhibit in the third, the fourth, the fifth and the seventh grades. It is a waste of effort for all these teachers to send for and use this exhibit in the same building. Some firms protect themselves from this duplication, but the teaching profession would have been advanced had it instituted the rule rather than have it forced upon them. Such a scheme of collecting is, of course, contrary to the ethical principles of class-room management and it can hardly be justified to the distributors of appliances, many of whom are really donating their samples to the schools. In some schools it is a necessary part of the management to define the bounds of the grade assignment in geography beyond the scanty outline of the course of study and to indicate definitely and con-

cisely in what grades certain educational exhibits should be used. Such a scheme is attempted here; not so much by actually listing exhibits as by outlining the principles to be observed.

How Educational Exhibits May Be Profitably Used

In the beginning work in geography—the home geography of the text books—there are a number of well defined lines of study. Among these may be mentioned the work on land forms in the neighborhood, distant land forms, simple types of life in strange environments and the food, shelter and clothing requirements of the different zones of the earth. The study of neighboring land forms should be observational and calls for little in the way of illustration; distant land forms demand pictures; simple types of life over the earth are best illustrated by pictures and models; food, clothing and shelter study may be enhanced by an educational exhibit of products from which they are manufactured.

In the first stage of making a collection every available picture is frequently cut and filed. As soon however as the collection permits a choice, many of the earlier pictures may be discarded in favor of new ones, but no new picture should be added to the collection unless it excels in some way pictures already on hand or adds a new interest or new light.

The Choice of Pictures

The choice of the picture may be illustrated by a single example. In many schools, in the early grades of geography work. the mountain stands as a type of land forms which cannot be taught from observation. Pictures are necessary. The work is in geography, not in physical geography or geology and this fact is an important element in the choice of studies. The effect of mountains upon mankind, the response which man makes to the mountain environment is the ideal point of view for the grade. Therefore the picture of the sharp peak of the Matterhorn is not so desirable as one which shows a rude cabin nestling on the narrow shelf of some less known peak. Pictures of mountains showing summer resorts, timber reserves and the lumber industry, highway and railroad difficulties, reservoirs, mining and home sites, are best suited for the work at this stage; and if by chance in the same picture with the human response there is illustrated the limitations of the activity through some mountain characteristic, such as height, snow cover, steepness of slope or location, the picture should be the more highly prized. I have seen a collection of mountain pictures for the fourth grade which included the simple folds of the Appalachians, a diagrammatic

representation of the complex folds of the Alps, the block mountains of Nevada and a host of pictures of rocky and snowy peaks. In the whole collection of over a hundred pictures, there were seven which might have been the nucleus of a collection of mountain pictures. The illustrations were good as far as they went but they did not illustrate the lessons which were to be taught. The tendency was to attempt to teach items beyond the preparation of the pupils. In like manner, pictures to illustrate simple types of life over the earth should be selected according to some ideal of teaching. Magazine pictures of people, in many instances, emphasize facial characteristics, ethnological traits and fashions or especially with amazing frequency the adornments of the body of the people of simple types of culture. Such pictures are not the best choice for elementary studies of life relationships. The pictures should show an adaptation to environment and should illustrate the industry, the play or the home life of the people in terms of climate, vegetation, topography and the like. The home-made model of an Eskimo or Indian village, while it is largely diagrammatic, has teaching qualities for a fourth grade that can hardly be equalled by pictures. I have seen the little folks of Jane Andrews' "Seven Little Sisters" very effectively portrayed in models and used in interesting class exercises.

Selecting Materials Wisely

It is an advantage to have exhibits to give interest to the teaching of lessons on food, clothing and shelter. The teacher's task here is to select wisely the illustrative materials for the grade. She does not need a pencil exhibit, a graphite exhibit or a spice exhibit; the flour exhibit is hardly suitable for this grade, yet certain parts of it have a bearing on the work. As a rule such an exhibit might well be left for later work; but the suitable parts of it might be used, if it can be so done without destroying the effectiveness of the original exhibit, to make an illustrative exhibit for the use of this grade. Where educational exhibits are usable in the succeeding grades, a school officer or a group of teachers might easily assign the exhibits so as to avoid duplication. A rubber exhibit can be used in the fifth grade (Brief Study of the World) and again in the sixth or seventh (South America). If the supervision is not careful, the work is repeated, the same method and the same illustrative materials being used in the two grades.

It frequently happens that the teacher overlooks the advantages of her home locality in her search for educational materials. I know a teacher who sent for every item marked "f· "

in the first list published by the Journal of Geography without any thought that a judicious selection was entailed, or that more valuable material was available at home. A home-made exhibit can be very effective and oftentimes it will surpass the exhibit assembled merely for advertising purposes. Furthermore, such an exhibit gives an impetus to the study of home geography and helps to remove it from the list of book studies which anomolous condition it has, in too many instances, reached. Most staples taught in two or more grades yield enough material to form a graded series of exhibits corresponding to the advancing stages of the development of the subject. For instance, in the earliest grade a cotton exhibit might comprise a cotton plant showing stem and ball, pictures of a cotton field ready for the pickers, samples of cotton seed and a few manufactured articles, depending on the industries of the school neighborhood; later, when the brief survey of the world is undertaken, the life of the people in the cotton belts becomes the emphasized feature around which the exhibit can be built, and finally in the intensive study of the United States the emphasis is placed on the manufacturing of cotton goods including the by-products. In mounting, a uniform size of white cardboard, 22 by 14 inches (one-half of the ordinary commercial board) is used, and the lettering may be done with a rubber stamp or more effectively with the cut letters on sale by many stationers. So varied is the manufacturing in a state like Rhode Island that nearly every important product studied in the geography course in the grades has its local setting to give interest and vividness to the teaching. Such illustrations are more in accord with the intent of the work in lower grades than many of the advertised educational exhibits—pencil, pen, graphite, glass, carborundum, and malted milk exhibits, to name a few.

In the later grades when problem work is in full sway or where economic, physical or commercial geography has a place, the more unusual exhibit may be used. There should begin and, if the course is long enough, there should be a fairly thorough use of a wide range of simple original sources, as government publications, atlases, commercial reports, and so on. Many teachers have acquired sets of stereographs and after the newness has worn off, these excellent pictures have been pushed aside largely because the plan of using them furnished by the sale agent is a diversion, desirable now and then, perhaps, but not adapted to the time limits of many geography lessons.

In the use of the problem method of study in upper grades, a more extensive use of the stereograph, as illustrative material, is

possible if the teacher assigns some of the questions for study with reference to such of the photographs as she has on hand. This avoids the expense of the entire class having the same picture at the same time or the waste of time resulting from the advised plan of passing a picture around the class during the recitation period in order to discuss it.

Most geography teachers have an immense amount of apparatus of one kind or another at hand. There is danger of being swamped with it, or of using a new thing for a day and then storing it. How many teachers order globes and after a great display leave them to gather dust in some dark corner of the closet! A study of the use of illustrative material ought to precede the ordering of it. Can you in your grade justify the use of every thing that you have collected?

WHEELING, WEST VIRGINIA*

By Helen M. Garden
Wheeling Public Schools

The City's Setting

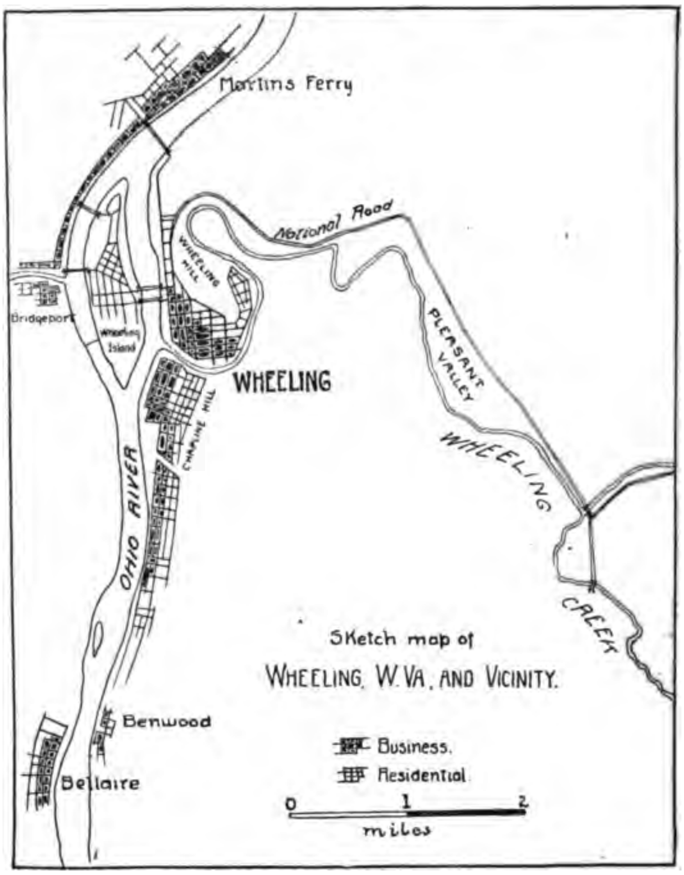
WEST Virginia in outline has roughly the shape of a pan with two handles. In the northern one of these two "pan handles," is located the city of Wheeling, its structures extending from the narrow flood plain of the Ohio River nearly to the tops of the adjacent valley slopes, 300 feet above the normal river level. Suburbs extend both along the river to the north and through Wheeling Creek Valley to the south-east. In the river channel, just opposite the city, is an island nearly two miles long and one-half mile wide. This island is connected with the city by two beautiful bridges.

The general region in which Wheeling is situated is a part of the well-marked physiographic province of the Appalachian Plateau and the larger topographic features of the city's setting give typical expression to the province's structure and history. The Ohio River, which is the main drainage outlet of the region, flows in a deep, early-mature valley, whose sides are interrupted by many minor, consequent gorges. A mile or so back from the river the surface of the country has a more rolling aspect, though it is still much dissected by steep tributary valleys.

The hill tops and the upper slopes are covered with a mantle of residual soil. Along the lower slopes of the Ohio Valley are found terraces and other residual masses of glacial sands and

*The writer desires to acknowledge the advice and assistance of Prof. O. D. von Engeln, of the Geology Department of Cornell University, in the preparation of this paper.

gravels filled in by tributary streams from the ice-border to the north during the Ice Age. Along the Ohio Valley bottom as well as in the bottoms of some of the larger tributaries are modern alluvial deposits. The island is an alluvial deposit resulting from the material brought by two large tributaries, each named Wheeling Creek.



Settlement and Growth

Fertile lands in the Ohio Valley early attracted settlers, mainly from Virginia, Pennsylvania, and Maryland. In 1770 the first of these settlers reached the mouth of Wheeling Creek. An elevation between the Creek and the Ohio, identified by Dr. White, State Geologist, as a remnant of one of the river terraces, affording a favorable site, they built cabins and later brought their families. This spot has since become part of the business section of the city.

The Ohio from the first afforded a ready means of transportation. When in 1818 the National Road was built from Cum-

berland, Maryland, to Wheeling (a distance of 200 miles) traffic immediately became very heavy; coaches and freight wagons formed an almost continuous procession, bringing passengers and products to the West. Wheeling shared with Pittsburgh the prosperity of being an upstream terminal of the wagon-borne freight from the industrial East. Much of the freight was destined for points on the Mississippi. At that time 2,000 arks and barges are said to have been plying on the Ohio.

Wheeling in Time of Flood

Owing to the melting of snow and to heavy rains in winter and spring, floods may occur any time from January to May. A gradual melting of snow usually causes two or three periods of high water during which the river overflows its banks, but without causing any serious inconvenience to people or business. Floods occur only after very heavy rains when the mountain snows are melting rapidly or when the ground is already saturated.

There is not an occurrence of the year that causes more excitement in Wheeling than the coming of a very high stage of water. The streets are full of hurrying people, men dressed in old clothes and wearing high boots; men, women and children carrying baskets of provisions, as a sufficient supply must be purchased to last several days. One great necessity, aside from food, is a supply of candles, as gas pipes in flood districts are soon covered. An unusual number of wagons and trucks is seen, most of them carrying goods from the wholesale houses, or pianos from the "island." People stand in groups discussing the latest reports and probability of their correctness. Bulletins are sent out by the Weather Bureau but people do not feel safe until the water is reported stationary at Pittsburgh. As Wheeling usually has 10 feet to 15 feet more than that city it is then known what to expect unless unusual conditions arise.

The furniture in houses that may be flooded is carried to the upper floors. The water seldom remains high for more than 2 or 3 hours, then goes down very rapidly. As the water falls, floors, porches and pavements are cleaned, even lawns are sometimes washed with a hose to prevent the settlement of mud and resultant ruin to grass plots.

Many Island houses have been raised so they will be above flood stage. From much experience, people have learned how to prepare for a flood and there is not a great amount of damage. The greatest loss is that of time in delayed business and extra expense in hauling goods from lower areas.

Wheeling as an Industrial City

Wheeling is a prosperous industrial city of 45,000 people, but it is the center of a region having 120,000 population. It has the advantages of abundant and cheap fuel, both coal and gas, excellent shipping facilities, both by rail and river, and abundance of labor, both skilled and common, consequently many manufacturing enterprises have been located there. The Census report for 1900 gives a list of over four hundred industrial establishments, the chief ones being iron and steel mills, glass works, cigar and tobacco factories, potteries, fruit preserving works, machinery and tool works.

The greatest industry is that of iron and steel. Coal and coke are brought to the city by the Baltimore & Ohio Railroad from the immediately adjacent territory. There are coal mines around the city in all directions and even in the city itself. Iron ore is brought by railroad from lake ports that received it from the Lake Superior mines. The fact that freight rates are the same, raw material as accessible, cheap labor as easily obtained, and living costs for workers lower, enables Wheeling to compete successfully with the mills of Pittsburgh. Cars sent out from Wheeling mills carry export pipe, light rails, bars, nails, tubing, casing, and lately munitions of war.

The Ohio Valley in its upper section forms a natural route of travel in a north-south direction with Wheeling and Pittsburgh at its head. During good stages of water numbers of coal boats pass down the river, their cargoes enroute from Pittsburgh to the Mississippi. The completion of government dams and locks, now under construction, will give the river a nine-foot stage practically all the year.

Fifteen Leading Materials of Manufacture in Our Foreign Trade

The ten great articles of manufacturing materials for which we (U. S.) now rely on foreign countries are: wool, silk, fibres, cotton, rubber, hides, copper, tin, gums, and nitrates, and the five great articles of food imported are: sugar, coffee, tea, cacao, and fruits. Of these ten great articles imported from abroad for manufacturing, our imports in 1917 were $1,060,000,000, against $431,000,000 ten years earlier, and the five great articles of food imported from foreign countries in 1917 were $482,000,000, against $234,000,000 ten years earlier, despite the fact that our islands had practically doubled their contributions of sugar meantime. These fifteen absolutely required articles from abroad for use in manufacturing or for food aggregated in round terms $1,500,000,000 in 1917, against $716,000,000 a decade earlier.

THE CONDITION OF GEOGRAPHY IN THE HIGH SCHOOL AND ITS OPPORTUNITY*

By Carl O. Sauer
University of Michigan, Ann Arbor

IN MOST high schools geography is the most recently introduced science. Physiography, or earth science, which was the first branch of geography to be taught, is almost entirely a development of the last twenty years in the high school. Its successful establishment in secondary schools was due to the development in the nineties of a vigorous group of university physiographers, two of whom, Tarr and Davis, wrote the first elementary texts which combined modern scientific content with a simple and attractive manner of presentation. A period of marked growth in physiography instruction at the turn of the century resulted. Since then, however, a general reaction has set in. In some sections of the country physiography is holding its modest place in the curriculum, in others different forms of science instruction, most particularly general science, are being substituted. The question is therefore: may geography redeem its position by remedying the deficiencies which have been discovered in physiography as taught at present, must geography give way to other branches of science or to a compendium of science as a whole, or will geography meet with better success if some branch other than physiography is chosen?

An inquiry into the reasons for the relative failure of physiography discloses immediately two causes, lack of properly trained teachers and an impression that the course lacks general practical value. For this condition the training schools, principally the universities, are in part responsible. The propagation of the subject has been in the hands of a relatively small number of university men, a much smaller number of instructors than is the case with any other science generally represented in the high school. The number of teachers who could be trained for the secondary schools has therefore been much smaller than in the case of biology, physics, and chemistry. The position of the science in the university has not been determined so much by its value to teachers or to a general education as by its function as a preparation for geology. Consequently the subject has developed chiefly along the lines of dynamic geology with the result that little stress has been put on the broader, geographic applications of the science which fit it for the more general needs of the elementary student. This geologic bias has serio[illegible] hampered the development of the subject in the high sc[illegible]

*Reprinted from Journal of the Michigan Schoolmaster's Club.

The number of teachers available has been thereby reduced and few of them have gone out into high school work with an emphatic idea of the value of physiography to an understanding of agriculture, forest conditions, transportation, and other types of industry. In large part physiography has not even been taught so as to aid in the appreciation of landscape. With some laudable exceptions therefore the chief non-geologic value of the subject has been its excellent training in the interpretation of scientific observations and in straight thinking, excellent results, to be sure, but hardly sufficient to win the support of high-school principals of today.

Minor causes have contributed to the failure of high-school physiography. In some places, instruction in the subject has not succeeded because there has not been enough local material to illustrate adequately physiographic processes. In Michigan this condition is much less true than in some parts of the Middle West, most particularly in the prairie regions, with their monotonous topography and nearly uniform soils. More commonly the failure has been due to a failure on the part of the teacher to recognize that his laboratory does not consist primarily of maps and models and cross-section paper, but of all out-doors. Field trips require initiative, and the teacher may be overworked without adding this task to his already numerous duties. They also raise new problems of discipline. Properly managed however they are the best stimulus to an understanding and appreciation of the subject. The lack of these first-hand experiences has damned many a physiography course to the monotony of text-book recitations alternating with the tedious busy-work of unprofitable drawing-lessons. Probably in the majority of cases the greatest stumbling-block has been the study of climate and weather, commonly comprising at least a third of the course. As presented in the hands of most inexperienced teachers, this part of the study becomes a veritable nightmare in its confusion of ideas and in its drudgery, and not uncommonly kills the interest in the entire course. For the average class and the average teacher it would be better to eliminate most of the technical meteorology and mathematical geography. Students will have received the important ideas if they can be made to understand the change of the seasons, the relation of relative humidity and evaporation, the causes of rain, and the cyclonic control of weather. With very rare exceptions high school graduates under the writer's observation have had no conception of these most fundamental climatic principles.

Because physiography has not developed the practical values inherent in the subject of geography and because it is also open to the other objections mentioned, other phases of geography have been proposed to take its place. The three forms which have attracted attention are: commercial geography, general principles of geography, and regional geography. Each of these is a study of life in reference to its environment; the emphasis is shifted from the inanimate world to the animate world. It is true that in all of them the best teaching requires training in physiography and also in anthropogeography. But it is also true that these subjects can be presented with fair success by a teacher who is not thoroughly grounded in the technical phases of physiography and that consequently there are less likely to be teaching failures in these lines. These subjects also make a more general appeal to the student because of the lesser amount of technical material, and because in them geographic principles are applied to practical life. From one standpoint these branches are simply the application of physiography to economic conditions. Due to their interesting contents and obvious value, these "humanized" forms of geography are winning their way rather rapidly in the high schools of the country.

The first of these more recent forms of geography to be introduced into secondary schools was commercial geography, the study of the production and exchange of the commodities of commerce. Its development in this country was in part in response to the success of this type of instruction in Europe, most especially in Great Britain. Ground was broken most particularly by the text of Adams, published in 1901. The practical information which this course gives regarding the world's work and the drill which it affords in place geography has won for commercial geography a position not alone in commercial courses but in non-vocational high schools as well. The subject is sufficiently well organized for presentation in the high school, the chief difference of opinion which remains being as to whether it is preferable to make the commodity or the region the unit of study.

The fundamental importance of geography in the grades and its recent successful introduction in advanced form into the universities and colleges leads to the conclusion that it should find representation in some general form in the high school. This need of a high school course in the general principles of geography has been the subject of discussion at various meetings of educators, most notably at the National Education Association, and by the Association of American Geographers. The task was first undertaken by Dryer, who published his High School Geog-

raphy in 1911, and by Salisbury, Barrows, and Tower with their Modern Geography, published in 1913. It is perhaps not too much to say that these two texts mark the most important innovation in high school geography to date. The great service which these pioneer texts are doing in hewing out the path of the "new geography" finds a practical appreciation in the extensive use which they enjoy after having been on the market for only a brief period.

The new type of instruction attempts to give a general view of the relations of life, most particularly of man, to environment. The major part of the content of physiography remains, but life responses are added. In this study physiographic processes are not considered as being of themselves of importance, but they are studied primarily in order to derive a systematic understanding of the environment in which man moves. Those items of physiography therefore which have little or no bearing on life are eliminated. From the standpoint of environmental influences such things as peneplains, subsequent and antecedent streams, eskers, drumlins, ice ramparts, and many others are of little significance. Such land forms, as plains, plateaus, and mountains, and their conditions of life, constitute important topics. As climate is one of the most important geographic factors, climatic influences and types of climate receive a great deal of attention, however with the suppression of much technical meteorological material. As soils determine in a most important way conditions of agriculture, of forest growth, and of transportation, the study of soils and soil influences should be an important part of the instruction in general geography. Mineral resources constitute a group of extensive geographic influences in their bearing on the distribution of population and the nature of industries and should receive adequate attention. It is doubtful whether a high school course in geography can profitably attempt to do much more than to give a working knowledge of climate, of the surface of the land and the processes which shape it, of the ocean, and of the mineral resources in their relations to life. These things can be done efficiently within the limits of time available. Elaborate applications of the sum of these geographic factors upon life introduced complications which may lead to confusion. The texts now published attempt to summarize their geographic instruction by final chapters of this sort. In one instance the distribution of the human species and of plant and animal life and the principles of commercial geography are introduced. In the other instance, such topics are taken up as, the distribution and development of the leading industries of the United States, the distri-

bution of population, and the development of cities. It is questionable whether sufficient time can be given to these broadly-designed summary studies so that they will not cloud the effects of the whole course by the quantity and complexity of their material. The verdict is being formed now in many class-rooms. In the meantime the suggestion is offered that after the relationship between individual geographic factors and life has been properly established the work may be simply and adequately summarized by work in home geography, the locality in which the course is given being considered as the unit of geographic study. Here is a splendid opportunity to plan profitable field trips and to view the influence of the sum total of geographic factors upon the home of the student.

Experiments are being made at present with courses in regional geography in the high school. Their principal purpose is to keep fresh and to expand the geography which has been learned in the grades. An objection to this type of instruction is that it is substantially a repetition of grade school work and introduces no new view-point. Place or regional geography can be taught very successfully in connection with both commercial geography, especially if taught on the regional plan, and with general geography as it has been outlined above. It is entirely appropriate that in the teaching of either type of high school geography a number of regions be chosen to illustrate geographic principles. If this is done all the place geography desired may be introduced without running the risk of making it a wearisome, encyclopaedic sort of study.

The salvation of geography in the high school lies in the development of general and commercial geography. Of the two the general course will fill by far the more responsible position in the curriculum. It includes all the most important teachings of physiography, and its interest is heightened by its application to the living world and especially to human activities. Its nature is cultural in the fullest sense in that it tends to give a world outlook. It should have as its great laboratory the home environment, which may be used quite as fully and successfully as in physiography or biology. General geography should provide as well a review in attractive form of locational geography. Is not this the solution of the general science problem? Here is a course of the broadest possible scope, thoroughly scientific in its content, consistent in its organization, linking earth science and biology, and with manifold applications to economic conditions. If all of those who have the interest of geography at heart will co-operate loyally they can assure in time the general recognition

of this course as a fundamental elementary science for the high school. Physiography will maintain itself as a more advanced elective course. Commercial geography will have at the least an important place in its proper vocational department. By giving our support to this grouping of the field of geography we can win for it its deserved place in secondary education and help to eliminate some of the will-o'-the-wisps that at present are disturbing the science situation in the high school.

NEWFOUNDLAND

NEWFOUNDLAND is a British colony occupying an important and commanding position off the eastern coast of North America, it includes not only the island by that name but also the east coast of Labrador; and by having refused to join the Dominion of Canada it still remains a colony of Great Britain. The island has an area of approximately 43,000 square miles and a population of about 225,000 people, or less than six inhabitants to the square mile. Due to the fact that the country is situated in latitude 48 to 50 degrees north, is in the direct path of the westerly winds from the continent, is influenced by the cold Labrador current from the north, has a very small amount of agricultural land, and is inhabited by a more or less backward people, Newfoundland has developed slowly. The coast has experienced intensive glaciation and deep fiords penetrate the island for 50 to 65 miles.

Agriculture, forestry, and manufacturing are carried on to a very limited degree, and they have up to the present time proved to be of small importance. By far the two most important industries of Newfoundland are fishing and mining, of which the former engages a very large per cent of the population. The fisheries of Newfoundland have long constituted the chief source of wealth of the island. The most important fishing is the cod fishing on the banks nearby; this forms eighty per cent of the entire industry and is more important here than in any other place in the world. The average annual export of dried cod fish is valued at between five and six million dollars. Besides cod fishing the lobster, herring, salmon and seal fisheries are important. St. Johns is the foremost fishing port.

It was not until recent years that Newfoundland was known to possess mineral deposits of great value. Copper was first discovered at the small fishing village of Tilt Cove in 1857. Sometime later a mine was opened, and in fifteen years 50,000 tons of copper ore valued at $1,572,154 and nickel valued at $32,740 was

mined. Iron mining has of late far surpassed copper mining; the principal deposits are at Bell Island in Conception Bay. The ore deposits are found in the strata that dip beneath the sea and thus the mines extend out under the ocean. In 1912 1,251,000 tons of iron were exported. This ore is taken for the most part by the large steel industries of Nova Scotia, but some of it reaches the United States and England.

The transportational facilities play a unique part in the modern development of the island. There are in operation somewhat more than 700 miles of Government railroads and 47 miles of private lines. Communication between various points of the coast and between the islands and the continent is usually maintained by a fleet of eight steamers, each of which connects with some point on the railway.

The government of Newfoundland is administered by a governor, assisted by an executive council of nine members, a legislative council of twenty members, and an elected house of assembly consisting of thirty-six members. E. M. Jones.

A TEST IN GENERAL GEOGRAPHY

SOME weeks ago the writer gave the following test to a class of two hundred and fifty college students who are now taking their first course in college geography. The purpose of the test was to reveal to the instructor something of the geographical content of his students' minds, and to reveal to the students the quality of their own geographical knowledge.

The questions were as follows:

1. On what river is each of the following? (1) Cincinnati, (2) Richmond, (3) Detroit, (4) Philadelphia, (5) St. Louis?
2. In what country is each of the following? (1) Buenos Aires, (2) Antwerp, (3) Calcutta, (4) Venice, (5) Halifax?
3. Give your best estimate of the distance between: (1) New York and Boston, (2) Chicago and New Orleans, (3) New York and Liverpool, (4) Paris and Berlin, (5) Berlin and Petrograd.
4. Which of our states is the largest producer of: (1) coal, (2) iron ore, (3) manufactured goods, (4) fruits, (5) automobiles?
5. In what country is each of the following rivers? (1) Rhone, (2) Ganges, (3) Clyde, (4) Tiber, (5) Volga?
6. Give your estimate of the area of: (1) Your own state (name it), (2) Japan, (3) United States, (4) British Isles, (5) Germany.

The results of the test were not in any sense surprising, inasmuch as similar tests are given each year and always with the same results. The average grade attained by the members of the class was between 40 and 50 per cent. while a considerable number of students fell below thirty per cent. and this in spite of the fact that questions three and six were treated with great liberality in grading. In the first hundred papers question No. 1 resulted as follows: Eight students failed to put Cincinnati on the Ohio river. Nineteen out of the hundred failed on St. Louis; sixty-five failed on Detroit; eighty failed on Philadelphia, and eighty-nine on Richmond. The first correct answer to this question was found in the fifty-ninth paper marked. The two cities which fared worst at the hands of the students were Philadelphia and Richmond, both of which cities are of such historical interest that students must have had occasion to study them in their history classes.

In question 2 considerably less than one-half of the students could tell even in what country Buenos Aires is, despite the fact that it is the largest city in the southern hemisphere. Antwerp was placed in Holland more frequently than in Belgium by the students. Venice fared well, but Halifax was placed in Denmark, England, India, Labrador, Newfoundland, Ontario, Australia, Norway, South Africa, and New Zealand.

Question 3, calling for estimates of distances between cities, was the most satisfactorily answered of all the questions. Taking the first ten papers marked, the distance was given as follows: Distance from New York to Boston: 200 mi., 600 mi., 400 mi., 200 mi., 500 mi., 400 mi., 200 mi., 60 mi., 150 mi., 9,000 mi. (Correct answer, 1,000 mi.)

Distance from Chicago to New Orleans: 500 mi., 1,000 mi., 5,000 mi., 800 mi., 900 mi., 1,000 mi., 700 mi., 800 mi., 210 mi., 19,000 mi. (Correct answer, 900 mi.)

Distance from New York to Liverpool: 3,000 mi., 2,200 mi., 3,000 mi., 2,500 mi., 3,000 mi., 2,000 mi., 585 mi., 2,000 mi., 6,000 mi., 20,000 mi. (Correct answer, 3,000 mi.)

Paris to Berlin: 500 mi., 600 mi., 500 mi., 700 mi., 150 mi., 150 mi., 250 mi., 300 mi., 10,000 mi. (Correct answer, 600 mi.)

Berlin to Petrograd: 350 mi., 1,500 mi., 700 mi., 800 mi., 750 mi., 800 mi., 1,000 mi., 105 mi., 200 mi., 18,000 mi. (Correct answer, 1,000 mi.)

Question 4, asking which of our states is the largest producer respectively, of coal, iron ore, manufactured goods, fruit, and automobiles, fared best with respect to automobiles, over ninety per cent of the students stating correctly that Michigan is the

leader. California, for fruits, also fared well. A very wide range of opinion concerning the leading state in general manufacturing was shown, many students believing that Wisconsin is the foremost manufacturing state. The honors were about equally shared between Massachusetts, Ohio, Illinois and New York; the last named being correct. Most of the students assigned correctly to Pennsylvania the foremost position in coal-mining, but only fourteen per cent gave correctly the leading producer of iron ore. This seems somewhat strange in view of the fact that Minnesota produces more than one-half of the iron ore mined in the United States and as much iron ore as any foreign country.

Question 5, asking in what country the Rhone, Clyde, Volga, Ganges, and Tiber respectively are averaged about fifty per cent. The Tiber for example was placed in Asia, France, India, Palestine, Africa, Siberia, Persia, Germany, Norway, Russia and Arabia. The Rhone was placed more frequently in Germany than in France.

The least satisfactory question of all was No. 6. The answers given reveal conclusively that even the best students who pass through our schools seldom get anything approaching an accurate idea of the area of their own country, or of other leading nations of the world. It is not to be expected that students will memorize many of these; that would be foolish. It may reasonably be expected, however, that they will know the approximate area of their own state and country and of one or two other countries. Knowing these they will be able to estimate with some degree of nearness the areas of other nations which count most in the worlds' affairs. The following answers indicate how little basis for estimating the areas of countries college students possess. The areas of the United States, of the British Isles, and of Japan were given by various students as follows:

United States	British Isles	Japan
8,000,000 sq. mi.	59,000 sq. mi.	50,000 sq. mi.
500,000 sq. mi.	4,000 sq. mi.	2,500 sq. mi.
100,000 sq. mi.	400 sq. mi.	20,000 sq. mi.
110,000,000 sq. mi.	40,000 sq. mi.	40,000,000 sq. mi.
3,000,000 sq. mi.	10,000,000 sq. mi.	50,000 sq. mi.
100,000 sq. mi.	30,000 sq. mi.	6,500 sq. mi.
800,000 sq. mi.	60,000 sq. mi.	750 sq. mi.
15,000 sq. mi.	1,000 sq. mi.	100,000 sq. mi.
15,000,000 sq. mi.	1,000,000 sq. mi.	500 sq. mi.
75,000,000 sq. mi.	228,000 sq. mi.	2,000 sq. mi
60,000 sq. mi.	5,000 sq. mi.	10,000,000 sq. m

This test, like similar tests given in other universities and normal schools, brings out how little reliable geographical knowledge students bring with them to the higher institutions, and shows why the beginning course in Geography in normal schools and colleges must take up the most elementary matters, in fact repeat much of the subject matter taught in the grade school. The difficulty seems to lie in the fact that pupils learn temporarily an enormous number of different facts without being made aware of any large difference in the relative importance of the facts, and within a short time the facts that are worth remembering and those that are not, all fade away together. R. H. W.

CLIMATIC NOTES ON THE BRITISH ISLES

The British Isles lie between 50° and 61° N. latitude; that is, they are entirely north of the northern boundary of the United States. London is farther north than any large Canadian City, and Northern Scotland is in the same latitude as the center of Hudson Bay, which is ice-bound 8 or 9 months each year.

Icebergs are not seen within hundreds of miles of the British Isles, while, on the western side of the Atlantic, they are seen off the coast of New England, 20° farther south.

So far north are the Shetland Islands that they have only 6 hours of daylight on Dec. 21, but have 18¾ hours on June 21. Even London has only 7¾ hours of daylight on Dec. 21.

So great is the warming effect of the North Atlantic Drift and the winds that blow from it, that the British Isles are 30° warmer in January than the average for their latitude.

Though London is 800 miles farther north than Chicago, it has the same mean annual temperature.

In the English winter, the heat derived from the sea is more effective than that derived from the sun, and the isortherms run north and south; that is, the temperature diminishes toward the east instead of toward the north.

Weather in the British Isles is very changeable; a change of 40° in temperature in 48 hours is not uncommon.

All parts of the islands are well supplied with rainfall, but the variation is very great; for example, 200 inches of rain fall in a year on highlands near the west coast of Scotland; Ben Nevis in Scotland gets an average of 160 inches a year, while a region only 70 miles east receives an average of but 25 inches a year; a part of eastern England receives less than 25 inches a year.

Unfortunately, spring is the driest season of the year for the British Isles, and fall is the wettest season; this is unfavorable to the growing of cereals.

The northwest part of the British Isles has rain on an average of 7 days in every 10; in the southeast, rain falls on 5 days in every 10. There are places which have rain on an average 27 days out of every month.

Snow falls in every part of the islands, and has fallen in London in July. During some entire years, however, no snow falls in London, and the city has snow on an average for only 14 days a year; even Edinburgh in the latitude of southern Hudson Bay, has only 21 snowy days a year. In southern England snow rarely lies on the ground longer than one day at a time. Snow falls every month in the year on high mountains in Scotland.

In general, the British Isles have a very high proportion of cloudy days. "The British Isles lie near the cloudiest part of one of the cloudiest belts on the earth."

OUR FOREIGN TRADE AFTER THE WAR

WHAT is the reason for the wide and growing interest in cultivating foreign fields shown at this moment by our shrewdest manufacturers? It is because American manufacturers realize that we will simply have to get foreign business after the war to provide an outlet for our over-production when war orders stop. We have greatly increased our manufacturing capacity in this country. We are catering not only to the military consumption of every kind of goods, but we are supplying the enormously increased consumption of our people here at home. It is hard to realize how many kinds of goods, even of what ordinarily are called luxuries, the war forces are consuming. And back of the fighting men, for months we have been providing for millions of workers devoted to the making of munitions and other war goods. Moreover, the billions of wages going to working people who never earned anything like so much before, and to hundreds of thousands who never earned any wages before, in this country, have created a consumption of goods right here at home the like of which neither this nor any other country ever before knew. Great manufacturing plants have added new buildings and new machinery, new plants have put up smokestacks everywhere in places where we never saw them before, and in tens of thousands of small shops in our cities we have expanded the production of goods to meet this home demand for the necessities and luxuries of ordinary life.

What is going to happen when the war ends? How are we going to dispose of the output of this tremendously increased industrial establishment? In the opinion of many of our leadin

manufacturers and business men there is going to be a well-defined effort made for foreign markets. They realize that in the development of a strong, vigorous export trade policy lies the security of our future prosperity. Our people are going to sell abroad with the same spirit they sell here. They are going in to win. They will win. American export business has never yet failed in any market where it went with the same spirit of determination, initiative, persistence and resourcefulness that is typical here at home. [E. A. Goff in *The Americas.*]

THE GROWTH OF THE MINING AND METAL INDUSTRIES IN FRANCE

ONE OF the most important questions which at the outset of the war, engaged the attention of those who were entrusted with the safety and welfare of France, was the supply of cast-iron and steel. In fact, just when the manufacture of war material required enormous quantities of these metals, our country, owing to the German invasion, was deprived of her most important fields of iron-ore, as well as the chief foundries for transforming this ore. The North African mines were immediately requisitioned. Iron-ore was purchased from Spain, steel from America and England. The foundries which had been closed since August 1914, for want of hands, were opened again by degrees. Many furnaces from glass-works were adapted for metallurgy; and the great mineral wealth of the French sub-soil, which till then had been turned to little account, was exploited. The results of these efforts soon made themselves felt. Before the war, out of the 5 million tons of coke required every year, France had to get more than 2 million from Germany. At the present time she can supply her own needs, and does not need to apply abroad for any coke. Supposing we take 100 as representing the output of cast-iron in September 1915, it rose progressively to 176 (in January 1916), 250 (July 1916), and to 280 (January 1917). For steel the same progression is noticeable. If the production of Martin and ordinary steel is represented by 100 for January 1915, it has reached now 155 for Martin steel, and 210 for ordinary steel.

New blast furnaces, the first of which has been recently inaugurated, are in themselves 100 ft. high. They can produce 400 *tons a day, which is the largest output obtained in Europe up till the present day.*

NEWS NOTES

The Cleveland School of Education, conducted jointly by the Western Reserve University and the Cleveland Normal School, has recently issued its list of extension courses including those in Geography. Prof. W. M. Gregory of the Cleveland Normal School is in charge of the four extension courses in Geography which are offered to Cleveland teachers. These courses are: (1) Elementary School Geography, (2) Industries of the United States, (3) Advanced Geography (Europe and South America), (4) Junior High School Geography. All of these classes meet either on Saturday forenoons or after hours on school days.

It is announced that Walter S. Tower and J. Paul Goode of the Department of Geography, University of Chicago, have been advanced to full professorships. Miss Mary J. Lanier formerly of Chicago University has been appointed Associate Professor of Geography in Wellesley college.

The Nebraska Council of Geography Teachers continues to issue its bulletins, under the editorship of Prof. W. G. Bishop. The last bulletin contains a valuable list of Material Helpful in Teaching the Geography of the United States and her Possessions. The list is prepared by Prof. J. T. Link of Seward, and is made up of six groups of reference books: (1) History as influenced by Geography, (2) Physiography, (3) Regional Geography, (4) Industrial and Commercial Geography, (5) Possessions of the United States, (6) General References. The bulletin announces the coming of Prof. A. P. Brigham who spoke at several meetings of the Nebraska State Teachers Association held about the first of November.

Miss Zonia Baber, head of the department of Geography in the school of education, University of Chicago, has recently brought out Excursion Bulletin Number 3 of the Geographical Society of Chicago. The Bulletin is published by the University of Chicago press and deals with the region known as Stony Island, a geological remnant within the present boundaries of Chicago. The bulletin has sixteen pages with fifteen illustrations. It discusses the geological history and physiographic development of this interesting region.

Most people know that Minneapolis is the leading flour milling city of the United States; few have any idea what the second city in rank is. Not so very long ago, New York City held second place in this industry; now it is Buffalo. Minneapolis grinds about 18 million barrels of flour a year; Buffalo, the second city, grinds 5½ million barrels; Kansas City, 3 million.

CHICAGO MEETING OF THE NATIONAL COUNCIL OF GEOGRAPHY TEACHERS AND OF THE ASSOCIATION OF AMERICAN GEOGRAPHERS

IT HAS been the custom to hold the annual meeting of the National Council of Geography Teachers in connection with the annual meeting of the Association of American Geographers. The custom will again be followed this year. The Association of American Geographers will meet in Rosenwald Hall, University of Chicago, Thursday and Friday, December 27th and 28th and also Saturday morning, December 29th if the length of the program shall require it. The meeting of the National Council of Geography Teachers will be held in Rosenwald Hall, University of Chicago, Wednesday afternoon and evening, December 26th. The program follows:

WEDNESDAY, DECEMBER 26.

1:45 P. M. *Geography Teaching in War Times—Its Responsibilities and Opportunities.—Speaker not secured.*

2:45 P. M. *Our Most Pressing Problems.*
The East, Robert M. Brown, Providence, R. I.
The Middle West, R. H. Whitbeck, Madison, Wis.
The West, James F. Chamberlain, Los Angeles, Cal.
The South, A. E. Parkins, Nashville, Tenn.
Leaders in Discussion:
Charles R. Dryer, Terre Haute, Ind.
Mabel Stark, Normal, Ill.
Mark Jefferson, Ypsilanti, Mich.
Geo. J. Miller, Mankato, Minn.

7:30 P. M. *Report of Executive Committee, and report on work of the Council during the past year—Geo. J. Miller, Sec.*
Discussion.

8:00 P. M. *Report of Committee on Normal School Geography.—Sumner W. Cushing, Salem, Mass.*

The meetings of the Association of American Geographers will be of interest to all teachers of geography, and of particular value to those who are engaged in teaching in high schools, normal schools, and colleges. It is hoped that as many as possible of the directors of the various State Councils will attend both the meetings of the National Council and of the American Geographers. This is the third time in fourteen years that the Association of American Geographers has met as far west as Chicago. Owing to the fact that the majority of the members live in the eastern states, more than one-half of the meetings may be expected to be held in the East. We therefore urge middle western geographers and teachers of geography to avail themselves of [illegible]ortunity to attend the meetings in Chicago this year.

MEETING OF WISCONSIN GEOGRAPHY TEACHERS

THE annual meeting of the Wisconsin Council of Geography Teachers took place in Milwaukee on November second. Reports of the officers indicated a healthy growth in membership during the past year. The old officers were re-elected. A plan is under way for securing in every larger school system in the state, a leader in Geography. Letters are being sent out to the superintendents of schools asking them to select one of their most enthusiastic teachers of Geography to act as the leader in geography in their respective schools. It is hoped to have a representative of the State Council in nearly every town and city in the state. These representatives will endeavor to promote interest in geography teaching in their schools by assisting other teachers in securing geographical material, keeping them informed about geographical activities in other parts of the state and country, and in a general way stirring up interest in geography-teaching.

For the first time the State Teachers Association of Wisconsin has accorded to geography a separate section, and an excellent program was presented this year. The geography section was particularly favored in having addresses by the chairman of the committee of High School Inspectors of the State University and one of the High School Inspectors of the State Department of Public Instruction. Both of these inspectors went on record as favoring the teaching of geography in all Wisconsin High Schools. The state department is preparing a course of study in geography for the high schools of the state, and there are the best of reasons for believing that increased attention will be given to geography in the high schools of the state. In addition to the addresses by the two high school inspectors, papers were presented on Geography Made Real by Field Studies, Miss Jennie Hall; Logical Attack of Geography in Secondary Schools, Lucius T. Gould.

GEOGRAPHY IN ILLINOIS

THE largest influence for or against the development of geography teaching is the attitude of the normal schools and of the principal university in any state. In the states west of the Alleghanies the state university is usually the most influential institution among the colleges. But even more important than the influence of the universities is that of the group of normal schools in a state. While the best normal schools have trained geog

phers in charge of the departments of geography, it does not follow that geography is given a reasonable opportunity. At the December meeting of the National Council of Geography Teachers in Chicago, Professor Cushing's committee will present a report on Geography in the Normal Schools. The National Council hopes gradually to create a better condition, so far as geography is concerned, in the normal schools.

All of our readers have noted the evidences of geographical activity in several of the normal schools of Illinois. The vigorous chairman of the Illinois State Council of Geography, Miss Mabel Stark, formerly a teacher in the Normal School at Normal, Illinois, has been made head of the Department of Geography of the De Kalb Normal. The valuable lists of Geographical Material obtainable free or at small cost, published in this Journal, were prepared by the librarian of the Charleston, Ill., Normal School. All of the Illinois normal schools have excellently trained teachers in charge of the work in geography, as have also the School of Education of the University of Chicago, and the Chicago Normal College. Added to all this is the strong department of Geography of the University of Chicago, and the growing departments in Northwestern University and in the University of Illinois.

We print herewith the list of geographical courses offered by the Macomb, Ill., Normal School. When a normal school reaches the point of offering fifteen courses in geography given by instructors who have received prolonged training for their work, there is cause for congratulation.

GEOGRAPHY

(Courses 1-6 given by E. L. Jay.)

Geography 1—Physical Geography. A study of Physiographic features, winds, rainfall, soil, etc., in their economic relations. Two double periods are spent in laboratory each week, and three single periods in recitation. Text: Salisbury, Barrows and Tower's Modern Geography. *One credit.*

Geography 2—Regional Geography. An intensive study of North America and the United States on the basis of physiographic regions. The industries and life of each region are studied as a result of geographic conditions. Text: Tarr and McMurry's New Geography, I and II. *One credit.*

Geography 3—Commercial Geography. Emphasis is placed upon the rational interpretation of the facts of commerce and trade rather than upon unrelated facts. The principles of economics which govern production, transportation, and consumption are studied, as illustrated by the great commercial nations of the world. Text: Smith's Commerce and Industry. *One credit.*

Geography 4—Geography of Illinois. An intensive regional study of the State of Illinois, its topography, climate, soils, minerals, and their relation to the development of agriculture, manufacturing, and commerce. No text. *One credit.*

Geography 5—Geography of South America. A detailed study of the life and industries of South America in their relation to soil, temperature, rainfall, natural resources, and character of the people. Emphasis will be given to future commercial possibilities especially in relation to our own country. Text: Enoch's Republics of South America. *One credit.*

Geography 6—Geography of Europe. A detailed study of the life and industries of Europe as determined by geographic conditions. No text. *One credit.*

(Courses 20-29 given by Herbert Bassett.)

Geography 20—A consideration of the aims, phases and methods in Geography.) Research work and field trips. Seven periods per week. Prematerial for the course of study in this subject. Observation and discussion in the work in geography in the model school is a vital part of this course. Text: Sutherland's The Teaching of Geography. *One credit.*

Geography 21(An advanced course in the interpretation of local geography.) Research work and field trips. Seven periods per week. Prerequisite, a course in physiography or geology.

Geography 23—Physiography. An advanced course in physical geography. Prerequisites: A fair elementary knowledge of botany, zoology, chemistry and physics. Open only to prepared students, and will not be given to fewer than ten students who will be in attendance the entire term. Text: Salisbury's Advanced Physiography. *One credit.*

Geography 24—Meteorology. This course treats of the atmosphere, its composition, temperature, pressure, and movements; the great wind zones, and their relation to rainfall. Some attention will be given to mathematical geography. Text: Waldo's and Milham's Meteorology. *One credit.*

Geography 25—Agricultural Geography. In this course a study is made of the agricultural products of the world, and of their distribution as determined by geographic factors, such as rainfall, temperature and soil. Text: Smith's Industrial and Commercial Geography. *One credit.*

Geography 26—Conservation of Natural Resources. Minerals, forests, waters, and soils are great natural resources upon which mankind depends for existence. These resources should be so used by the present generation that they may continue for future generations. Text: Van Hise's Conservation of Natural Resources in the United States. *One credit.*

Geography 27—Original research work and term theme in addition to outline of course as given under Geography 4. Cannot be taken for credit if one has credit in Geography 4. *One credit.*

Geography 28—Original research work and term theme in addition to outline of course as given under Geography 5. Cannot be taken for credit if one has credit in Geography 5. *One credit.*

Geography 29—Original research work and term theme in addition to outline of course given under Geography 6. Cannot be taken for credit by one who has had Geography 6. *One credit.*

GEOGRAPHICAL ACTIVITIES IN NEW ENGLAND

AS OUR readers know, Massachusetts was active last year in building up its State Council of Geography Teachers and the National Council of Geography Teachers. That activity is continuing this year. The annual meeting was held in Boston on November 17th, and was addresseb dy Professors A. P. Brigham, R. E. Dodge, W. W. Atwood and others. At the annual meeting of the Essex County Teachers' Association, November 2nd, Prof. R. H. Whitbeck addressed two meetings with a total attendance

of about two thousand teachers, dealing with "Matter and Method in Elementary Geography" and "Geography and General Science." On the same day Prof. Elizabeth Fisher of Wellesley College addressed a meeting in Worcester on the subject of Geography Teaching. Prof. Whitbeck also lectured on Geography at Wellesley College and the Salem Normal School, addressed two audiences of teachers in Providence, one in New Haven, one in Hartford, and the Normal School in Farmington, Maine.

The Rhode Island teachers are at work actively in geographical lines and Prof. Robert M. Brown of the Providence Normal School is carrying on extension courses in geography which reach nearly every part of the state.

In Connecticut, Prof. Charles E. Pratt of the New Britain Normal School, chairman of the Council of Geography Teachers, is pushing the organization of the Council with vigor. Under his management large sections of teachers were addressed upon the subject of Geography Teaching in both New Haven and Hartford. Some forty or fifty teachers united with the State and National Councils. In his circular Prof. Pratt announces as follows:

"The Connecticut Council will organize various committees to investigate and report at its meetings on such topics as the following:—

1. The Local Geography of a Selected Community.
2. Type Lessons for Grades III and IV.
3. " " " " IV, V and VI.
4. " " " " VII and VIII.
5. Comparison of Geography Courses within your County.
6. " " " " " " State.
7. Organization of a Geography Course for Rural Schools of Conn.
8. " " " " " City " "
9. ....

It will be the aim of our Council to print the most helpful reports for free distribution among its members and for use in our schools.

With the large number of interested and efficient geographers in New England, it may be expected that the work of rejuvenating geography teaching in New England will proceed actively."

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HUMANIZING SCHOOL GEOGRAPHY

By Richard E. Dodge
Washington, Conn.

TEACHERS of geography in Elementary and Secondary schools have an opportunity and a responsibility, as never before, to make their subject vital and interesting and show pupils that it is of great value in helping understand world conditions as they are today and as they will be when the world again becomes normal and the relations between countries and people cease to change almost with the passing hours.

Geography in the past has been too impersonal. When the store or the coal yard were filled to overflowing and one could satisfy all the bodily needs without thinking back of the immediate source of supply, few people could realize that there was any geography in every day life. Most pupils and adults thought of geography as a matter of place only, with perhaps certain interesting incidentals as to scenery, peoples and customs, with less interesting but yet ever present facts of production. Geography was a catch-all of facts, some vital, but mostly merely informational, and most people thought there was nothing worth while in Geography that fitted the mental development of those who had advanced beyond the elementary school.

Man had lost his direct touch, mental or physical, with the land that supported him, and was not directly concerned with the problems of transportation or production. The great horn-of-plenty of Nature in some mysterious but unquestioned way, furnished the necessities of life, when wanted and where wanted. Why be concerned with the autumn weather conditions in North Dakota or Canada, when flour was to be had at every corner grocery?

How different are the conditions now! Everyone knows that the world faces a famine, that the essential food materials must be raised locally as far as possible, and that the loaf of bread produced at home from locally grown grain not only helps solve the personal problem of sustaining life, but is a contribution of no mean significance to the still greater problem of feeding the millions of men and women, soldiers, factory workers and others who are withdrawn from production of foods and other neces-

sities of daily life, and helping in the stupendous problem of making the world safe for humanity and civilization.

Every one today realizes his own direct personal dependence on the earth that sustains him: the weather of the growing season of North Dakota *is* a personal matter to the factory worker in New England; the corn crop of the Middle West *is* of vital interest to the householder that realizes the necessity of saving wheat. The economic relations that have always existed between distant sections of the country or the world are now realized, they are talked about and discussed. Human problems are the interesting problems to all who think and read. Many of these problems, indeed most of the human problems of today, have a geographic foundation. Indeed, they are but phases of human geography.

Here is our opportunity to humanize school geography, to show that a knowledge of geography and especially of the facts and relationships of human geography, gives a key for interpreting and understanding the world relations which seem at first, perhaps, to be a chaos of chance conditions.

Individuals and groups of individuals over all the world, civilized and what we once thought were civilized, are engaged in the same great problem of making a living. Wherever humanity is found, whether in thickly settled cities or sparsely scattered over the vast areas of great plains, people are individually working to make a living. Some localities are practically self dependent. They produce nearly all the essentials of life and have few economic exchanges with other sections. Thus it was in America before the industrial era made possible specialization of labor and gave us cities and towns that were dependent on the country, and rural regions almost equally dependent on perhaps distant markets for at least some of the necessities of every day life.

Today we in America are becoming more self dependent. The backyard gardens and the home knitting, either by hand or machine, are helping make the individual home less dependent on the store or the market. This condition is destined to persist for some time and people for the next few years, by necessity or choice, will endeavor increasingly to become more self sufficient.

Whether dependent or self sufficient, every single home or group of homes is placed in a certain geographic setting. The type and form of houses people live in, their character of work, their clothes and perhaps even their outlook on life reflect the background amid which they live. Surface features,—landscape

and not individual land forms,—form their physical surroundings. The landscape, the soil, the climate, especially of the growing season, the water resources of streams and soil, give individuality to their habitat and determine in large part the form of production they will engage in if they are tillers of the soil. The natural vegetation,—whether grasses, to which most cereals belong, or forests and grass, that furnish food, fuel, materials for construction and tools,—also is a factor of the landscape, a natural resource that influences the form of labor of a given region. The relative location of the area to markets, that is, to sources of demand, perhaps may determine the exact form of production to be followed in a community.

Everywhere people must work to secure the five essential needs of life: food, clothing, shelter, defence, and some form of power. Their daily lives are devoted to making a living, which usually means certain of the necessities and an economic surplus of some form that can be exchanged for necessities or desired products that cannot be economically produced at home.

The economic surplus not needed for home consumption, whether wheat, corn, cotton, shoes, automobile tires or Attar of Roses, is the one thing we usually emphasize in reference to a given area. It is a human item, to be sure, but it may not suggest a real and true picture of the life work of the people producing it, and geography should attempt to create visual images of how a country looks, what the people are doing and why they are doing it.

Corn, for instance, is produced in sufficient quantities to be reported by the Census Bureau in every state of the Union except Nevada. Yet most pupils perhaps get the impression that corn is produced only in the corn surplus states or Corn Belt of the central West. Yet corn fields are a conspicuous feature of the landscape in New England as in Georgia, in sections of Minnesota as in Ohio or Iowa. A real interpretation of what people are doing to make a living would include what is produced for local needs as well as for exchange.

Let us therefore not give undue emphasis to the advertising items, of little significance perhaps, but make our regional study a study of human geography in a broader way. Let us study a given section as a region where people are living as full a life as they can and let us study what they are doing and why.

School geography can be humanized in three distinct ways: by choosing for study those features of a section that help us in-

terpret the life conditions; by studying the necessary items of information as to location, as to physical features, products, etc., as far as we can, so as to bring out their human relations; and by making our class methods a little bit less unhuman than they have been.

Geography in schools must include many items of information, but most of the vital items can be humanized. There is nothing inherently interesting in a mountain as such, but a mountain as a source of necessary constructional materials, as an obect of landscape beauty, or as the home of animals and plants different from those about its base, or as a health or pleasure resort, becomes humanized. There are few capes in the world that pupils need to be able to locate exactly and those few have a human interest. Cape Hatteras, because of the dangers it offers to coastwise shipping, is a human cape; so is the Cape of Good Hope with its associations with stories of the early seekers of water routes to the Orient, or Cape Horn with its human interests furnished by the '49ers who were attracted by the glamour of gold in California. What a difference to the child between learning by memory the location of Cape Horn and thinking of it as a corner post that must be passed against the wind by sailing vessels before the days of steam.

There is nothing inherently interesting in the old, inaccurate definition of a river, in its length, or the states it bounds. But what a difference when it is studied as an artery that holds in one common association of interests, the cities and lands and peoples about it. A river binds and does not divide people. It is, or may be, the flowing road that makes possible interchange of thoughts and products. Everywhere people have roads; they are one of the ever present associations with groups of people. The flowing road gives cheapness and ease of movement and has played and is playing a part in the progress of the world of great human interest.

Again, location of places as a matter of memory is not inherently interesting to most children, but location as studied in its relation to the "strategic points" that have so vitally determined its significance is a thing of interest. It is one thing to learn that Louisville is at the falls of the Ohio, Richmond at the falls of the James, or Buffalo at the lower end of Lake Erie. But it is another very different thing to know these locations as a response to the physical surroundings.

It is an axiom of human geography that wherever there is of necessity a break in the method of transportation along a signifi-

cant route of commerce, there a city will develop. When the necessity of changing the method of transport, as for instance from water to land occurs, the change is usually from a cheaper to a more expensive form of transportation. Hence the necessity of breaking up the bulky raw product that can be economically transported by water into the more concentrated forms with greater value in a given bulk, that can be profitably transported by the more expensive means of movement. This explains in part at least, or gives meaning to the iron furnaces and mills around Buffalo, where the bulky raw iron from the upper Lakes is changed into the more valuable and less bulky pig iron, or the still more valuable structural steel. In the same way, the bulky and readily handled wheat is broken up into its various parts, flour and by-products. The flour may be sent on its way eastward to the seaboard cities for local use or foreign exportation. The by-products, so valuable for cattle food, are sent by different routes to the sections that need them. The trunk line of the Great Lakes is connected at Buffalo with the myriads of water and rail routes that bring the markets near to this great manufacturing city.

Buffalo has other physical conditions that have favored its growth and significance, but perhaps the most "strategic" item in its casual relations is that of position at the lower end of the Lakes where of necessity freight in transit must go ashore.

The same necessity of change in form of transport existed in the early days at Louisville where the up river flat boats gave way to the down river boats the other side of the falls. So at Richmond, at Bangor, Maine, at Chicago, at St. Louis and many other places the same fundamental "cause" operates. Strategic points in geography thus interpreted become short hand generalizations which help in the understanding of the reasons for things in far distant sections of the world. They are principles of human geography as worth while and perhaps more interesting and easily understood than some of the generalizations of physical geography that we do not usually humanize.

Any teacher who has caught the spirit of human geography will humanize her school work. Her pupils will not learn lessons from books. They will study and interpret, so far as their ages and abilities permit, the human conditions in the several great countries of the world. They will find each area interesting because it is the home of people engaged in the great world wide task of living as full a life as possible. Their methods of work, their interests in other peoples, their relative significance

in the economic or political world, are worth studying because we can approach them sympathetically. We can understand similarities of procedure and find "problems" in variations of procedure because they are human responses to varied physical conditions.

Every section furnishes points of attack full of human interest. Problems arise for answer, they do not have to be hatched in a far-fetched way. Any details of life of a given section, any industrial, social or political relationships of a given section to us or to regions we know, becomes an object of study and interest. Here is the real source of "problems" in geography.

The problem method has always been used by the best teachers. It is now coming to its own as a method for more general use. The problem method, when the problems are real and personal to the pupils, is the natural method of procedure, for it provokes real study and thinking, training in the use of source materials, of maps, text and reference volumes.

The problem method is not, however, a panacea for all weaknesses of teaching. A series of memory exercises on location, surface features, climate, products, etc., is not a problem even if the chapter heading ends with a question mark. Neither are problems vital to pupils when a unit problem is too big and inclusive for definiteness or exactness, or when it is an adult made query beyond the sympathetic understanding of the pupils. Problems, to be worth while, must be personal to the pupils and so far as possible suggested by them.

The problems of geography are human problems, for geography is a humanity as it is a science. It is one of the human sciences. Let us give it flesh and blood, vitalize it in content and method, and make it a contributing force in the education of children, especially now when we are training the aroused youths who must in a few years take their part in solving the great world problems that no one can now foresee in detail.

The teacher with an interest in folks as well as things, trained in geography, of which the highest aspect is human geography—and commercial geography is but one phase of human geography, though it may be as devitalized as are the earth motions—has an opportunity and a responsibility far beyond any given to her predecessors of the craft. This is a time when human interests are dominant. Geography can be humanized as never before because people are calling for its wares, if of human worth. Let us catch the spirit of the times and be human teachers of one of the most vital of human subjects—geography.

A GEOGRAPHER'S GEOGRAPHY LESSON ON THE PRAIRIES

By Albert Perry Brigham
Colgate University, Hamilton, N. Y.

TO THE deep satisfaction of the writer, a share was given him in the work of the Nebraska geographers at the State Teachers Association held in Omaha on the eighth, ninth and tenth of November. Addresses were given before the Nebraska branch of the National Council, and before the sections of Commerce, Geography and Literature. The Council commanded a large attendance at an early hour in the parlors of Hotel Rome, where thoroughly matured reports were offered by Professor Rose B. Clark on Geography in the Elementary School; by Professor Jeannette C. Nelson on Geography in the Junior High School; and by Professor A. J. Mercer on Geography in the High School. The Geography section, under the presidency of Professor N. A. Bengtson, was adjourned from a small room to a large hall to make room for the hundreds that sought attendance. The work of this section will be directed during the coming year by Superintendent W. T. Davis of the McCook schools. An informal dinner at Hotel Castle on Thursday evening brought together a select group of workers, and was given to discussion, especially of the baffling but vital problem of geography in the high school.

The value of emphasis on mature geography in the higher schools is well to be seen in this State. The Department of Geography in the University of Nebraska, through Dr. Condra, its head, and Professor Bengtson and others associated with them, wields a vital power in all school work in the subject. The value of geographic study is also brought home to the people through an unusual correlation with the department, of several practical activities. Thus Dr. Condra is director of the Soil Survey, in cooperation with the United States Bureau of Soils. Closely related are also the State Conservation and Welfare Commission, the State Highway Commission, the investigation of road materials and the new development of the potash industry. A useful item of conservation work has been the preparation of 40,000 feet of film illustrating the principal industries and regions of Nebraska. These films have been widely shown in and out of the state and are everywhere available to the geography teachers.

The excuse for overstepping the Mississippi and the Missouri was a call to give help in geography. In attempting so to

do far more was gained than was given. Through the courtesy of friends some hundreds of miles of country road and of farms were seen about Omaha, near Lincoln, and in the parts of Iowa northward from Des Moines. Some geography can be learned from books and teachers, but more can be gotten, and irrevokably, from the soil and the surface. The writer thought he knew somewhat about the prairies and had even ventured a small way into print, but it was mainly from car window and book. But when there are five, or ten, or twelve feet of black earth under the foot and when the eye rests on yellow fields of corn all the way to the horizon, the prairie gathers solidity in the consciousness. One sees why the "poor white trash" is so rare as to be the exception, proving the proud dictum of the prairie dweller,—of such "we have none." Land at $200, or $250 per acre will not let poor people live on it. The geographer does not intend to get into trouble here by delving into precise reasons—enough that in the heart of the prairies it is true.

The memory dimly recalls relatives who migrated after the Civil War from western New York to western Iowa. What would be their fortunes in that remote region, when Iowa was perhaps twenty years from the beginning of its statehood? To-day the shack has given way to the mansion, and the windbreaks, grown tall, give the aspect of little woodlots surrounding the homes. Palace cars run from Sioux City to Des Moines and St. Louis, and from Omaha to Chicago, Denver and the Pacific Coast. And the corn field and the steer, the village elevator and the railroad, the packing house and the telegraph, point the way from the prairie to all lands. Thus home geography amplifies into world geography.

Here in the North Central prairie is an adjustment of man to the earth. Out of it we can pick some geographic bits. Iowa might raise and once did raise much wheat. Wheat as a frontier crop has moved on to the northwest, and wheat as an intensive crop yields the farmer less than corn, steer and hog. An eastern breeder of fancy milkers told an audience of Iowa farmers that they might create a great dairy state. But the Iowa farmer, taught by his agricultural schools, by tons of farm periodicals and by his experience, knows that he might, but that he will not, for the present adjustment puts more money into his pocket than the dairy alternative could promise. He does not buy costly sires from the east, but "feeders," gathered from the plains at Omaha. If you ask him how many he has, he answers, one, two, or more "carloads." He can buy or sell better in multiples of twenty, because he keeps harmony with shipping requirements,

and thus he weaves an added small mesh in the geographic net. He feeds the steers a year, more or less, from his pastures and corn cribs, and they move on eastward. The teacher can put these things together—herds on the great plains, Omaha, packing houses, feeders, Iowa black soil, corn, alfalfa, the Chicago packing house, New York, Liverpool,—local geography—world geography!

Not only soil and corn, but the climate, makes it easier to fatten steers than in the East. The corn stalks, freed by the husker, but still standing, are broused by the cattle to late autumn or early winter. There is not too much snow and less housing is required than in the snowbound East. The overhanging straw stack and the lee of barns and windbreaks will serve for shelter save when the blizzard is abroad. And the swine, nicely adjusted to the number of cattle on the individual farm, live from what the steer leaves on the ground or in the manure heap. Nor may we forget the economy of having eighty acres of corn in one field or tilling those eighty acres by advanced types of machinery. Compare the eastern cornfield, the silo, the cutting, shocking, husking, piling and drawing of dry corn, with the husker and the wagon and the seventy or hundred bushels per day of one man and one team on the prairie.

In the East, the traveller finds trunk lines of highway along which his motor car may securely move, but he swings at his peril into the byways and hill roads of New York or New England. On the prairie however nearly every road is safely open. The subsoil is readily turnpiked by powerful road machines, gravel is drawn on and a good road soon develops, and in the drier climate is relatively permanent. Such conditions aid in putting a "flivver"—Ford car—on almost every farm, and in a certain prairie county, no doubt in nearly all, every resident could travel at the same moment in the county's outfit of automobiles. This condition, plus the telephone, destroys distance and makes large areas of farm homes into closeknit communities. The farmer's family like the farmer himself, changes its horizon in the late hours of the afternoon, when the day's work is done and the horses are at rest. Thus geographic conditions before we know it land us in the field of sociology and we retrace our steps lest we meet the scoffer with his quest for a definition of geography.

The prairie, from Chicago to central Nebraska, reveals almost no waste land. This statement becomes more nearly exact each year, through the vast amount of tiling by which the low

places and bogs are undergoing reclamation. Field after field was pointed out with the remark—here, five or ten years ago was a lake.

The amount of surface relief, and the variety of it, are not well known, and our books do not adequately describe it. We content ourselves with references to the valleys cut by dissecting agencies below the plain and by noting those glacial thickenings which lie above it. This easy way however gives no knowledge of the heavily rolling surfaces of the deeply dissected drift sheets of southwestern Iowa and eastern Nebraska, and fails wholly to mark those endless gentle swells and descents which relieve the landscape of monotony and make it quite unsafe to take the Red River bottoms or the High Plains as types of surface in the North Central region.

Why does Iowa, older and greater in population, remain essentially a rural state while Nebraska develops a large city on the banks of its greatest river? It may be objected that Iowa with its more numerous cities outnumbers in urban population its western neighbor. The fact remains that Iowa has not, and seems not likely to have, a city of the first order of population. Council Bluffs, like Omaha, is on the Missouri River and is older than Omaha, but Council Bluffs is perhaps on the wrong side of its state for great growth, though conditions at Kansas City throw doubt on this conclusion. At all events Omaha, the Nebraska terminal of the Union Pacific Railway, was thus destined nearly a half century ago, to be the great city of Nebraska, the gathering station and point of departure of its vast products.

On the east it would seem that the twin cities in the north, St. Louis in the south, and Chicago on the shore of Lake Michigan, eliminated any hope that Iowa might have a great city on the Mississippi River. It may be quite to the weal of a rich state to be without a great city. The problems of city growth, thus hinted at but in no degree solved, might well claim intensive study from some North Central geographer.

IMPORTANT NOTICE

The Association of American Geographers has decided to omit its annual meeting which was scheduled to be held at the University of Chicago, Dec. 27-29. The annual meeting of the National Council of Geography Teachers which was to be held in connection with that meeting will also be omitted; this action by the National Council seems advisable, as it is believed that comparatively few of the members would feel justified in incurring the expense of a trip to Chicago for a one day's meeting.

SUGGESTIONS FOR TEACHING ELEMENTARY GEOGRAPHY

By R. H. Whitbeck
University of Wisconsin, Madison

(Concluded from December)

The "Why" Phase of Geography

IN THE recent past we have heard, and we now hear urgent pleas for greater stress upon the causal idea in geography. It is a fact that cause and consequence are the keynote of modern scientific geography. No one would willingly return to the old purely memoriter type of instruction. All teachers are agreed that, to the fullest extent consistent with the pupils' abilities, the causal notion should be introduced into geography. But we must not overlook the important qualification, "so far as consistent with the pupil's abilities." Children in the fifth and sixth grades can reason on simple matters which come within their experience and knowledge; but that experience is usually very limited and that knowledge very immature. But the teaching of causes and consequences in elementary geography does not mean that the pupils reason out for themselves all of the causes and consequences. Many of them are taught to the pupils just as other facts are: for example, we teach the pupil that New York has an excellent harbor, and we also teach him that the cause of this deep, enclosed bay is found in the sinking of the land which drowned the mouth of the Hudson River. We teach the "why" of many things which pupils could not reason out for themselves.

A well developed plan for the work of any grade will include a definite list of "whys" which the teacher proposes to discuss in the course of the year. Some of these may be the following:

1. Why does the wind blow?
2. Why do clouds form? Why do they disappear?
3. Why does it rain?
4. Why do we have day and night?
5. Why do we have seasons? (simple explanation only)
6. Why are there rivers?
7. Why is the land mantled with soil?
8. Why are there hills and mountains?
9. Why are there continents and oceans?
10. Why do things cling to the earth?
11. Why do the moon and sun seem to rise and set?
12. Why does each shine?

13. Why is winter colder than summer?
14. Why is night colder than day?
15. Why does water run down hill?
16. Why is the ocean salt?
17. Why does the ocean not increase in depth since hundreds of rivers flow into it?
18. Why does the moon change from "new" to "full" and then back to "new" again?
19. Why are our summer days long and our winter days short?
20. Why does it snow in winter but not in summer?

Then a group of "whys" in social geography:

1. Why are people engaged in such a great variety of occupations?
2. Why do we build houses? roads? railroads?
3. Why does a city have policemen? a fire department? sewers? paved streets? street cars? city water? a postal system? telephone system? schools? Do all cities have these?
4. Why do so many people live in cities instead of in the country?
5. Why do we have painters, carpenters, tailors, when we might learn to do our own painting, and to make our own clothing?
6. Why do we have stores and markets? Why so many kinds of stores?
7. Why do not all people raise their own vegetables, fruit, grain, and other kinds of food instead of buying them?
8. Why do we have laws and courts, and why may not anyone do whatever he wishes?
9. Why are children in the United States compelled to attend school? (even though parents may not wish it.)
10. Why do we divide states into counties, and counties into townships, and cities into wards?

Drill and Reviews

The great majority of the facts which find a place in text books are not intended to be remembered permanently. They are learned for the time being, but soon only a hazy memory of them remains. It does not follow, however, that the effort made to learn these facts is wasted. The geographical facts which one learns, but afterwards forgets, give a basis for intelligent thinking and judging in regard to things geographical—a kind of ge-

ographical intelligence—and this is an essential part of an education.

But there is another and much smaller group of geographical facts which people find a decided advantage in remembering. No two people would agree upon the exact make-up of this group of facts, and no teacher could make a list to which he would permanently adhere; yet, we all believe that there must be a body of geographical knowledge which people would profit by having fixed in mind so firmly that it becomes a permanent possession. From the teacher's standpoint the first-mentioned large group of facts and relations belongs to the category of things that are *to have been known;* the latter small group consists of things that are *to be known.* No one can draw the exact boundary between the two groups, yet the recognition that two such groups exist and ought to be differentiated will result in a better distribution of emphasis and hence better teaching. The first-mentioned larger group of geographical facts does not call for drill or careful review, but the small body of fundamental knowledge which is to be taught so that it sticks must be drilled and reviewed. Any theory of education which taboos drill is a very foolish theory and happily almost everybody knows that it is foolish. One of our problems, then, is the judicious selecting of these facts which we propose to review from time to time.

This plan calls for means which shall facilitate drill and review. Unless some means are devised whereby this selected list of facts can be conveniently brought into use for review, we shall find ourselves omitting the review, and then the plan will have failed. In short, a group of items which we desire to review more or less frequently must be (1) put into definite, usable form; and (2) it must be conveniently at hand so that without waste of time it can be brought into use. The most successful devices for this purpose that I am familiar with are the following:

Review Devices

Decide upon the lists of cities, rivers, islands, mountains, and other features which you desire to review from time to time; secure two or three or more buff-colored window shades mounted on spring rollers; draw light pencil lines about two inches apart across the shades from left to right; divide the shades by vertical lines into three or four columns. With a small camel's hair brush, such as you use for water-color work, and with dead black ink print the lists of cities, rivers, etc., in columns on the shades. The shade on its spring roller is mounted with ordinary fixtures above

the black board, or in any convenient place where it can be pulled down at a second's notice.

This method of review may consist in,—

(1) the pupil's stating merely in what country the city is located;
(2) locating starred (*) cities more definitely;
(3) giving one fact (or more) of interest about each city;
(4) selecting a few cities and discovering how many facts about each the pupils can supply.

A list of important commercial products may be prepared in the same way, and pupils called upon to name one country, two countries, or three countries from which we buy these commodities in large quantities. Such a list would include:

sugar	olives	woolen suitings
coffee	figs	fine cottons
tea	dyes	silk goods
cocoa	toys	wines
raw silk	tin	linen
wool	spices	diamonds
cotton	rice	bananas
dates	olive oil	rubber

A list which always arouses interest is a "What and Where" list. The pupil is required to know whether a certain word is the name of a city, a river, a lake, or something else, and then to tell where it is.

The second of the devices for definite and convenient review requires a package of cards about 2¼ x 4 inches, or any other convenient size. As the daily work of the geography class progresses, the teacher selects from each lesson a few really significant questions which ought to be reviewed later and writes these upon the cards. These are always at hand ready for review and the teacher is sure that important points that have been taken up will not be lost sight of in the progress of the work.

A variation of this device constitutes a profitable classroom game. The teacher has a package of cards upon which are questions that can be answered in a word or two. On some part of the blackboard that can be spared, the names of the members of the class are written and left from week to week. When the geographical game is to be played, a pupil is appointed clerk and takes his place by the list of names at the board. From her cards the teacher reads a question and the first pupil who answers it is credited with one point by the clerk at the board. A five-minute

drill of this sort once or twice a week is thoroughly profitable. The following questions may serve as types:

It will be observed that the device requires questions which can be answered in a word or two. Each square here represents a card.

Foremost seaport of the United States? Largest country of South America? Capital of Russia? Form of government in France?	River of Scotland famed for its ship-building yards? Cape at the southern extremity of South America? Largest city in New England?	Most valuable crop raised in the United States? Seat of government of Canada? Mountains between France and Spain? Area of the U. S. (in round numbers)?
River—outlet of the Great Lakes? Strait between Alaska and Asia? Principal river of Germany?	City at western end of Erie Canal? Capital city of China? Chief iron-ore producing state of the United States?	Most populous state of the Union? Largest island of the West Indies? River upon which London is situated?
River between Texas and Mexico? City near the junction of the Mississippi and Missouri Rivers? Leading French port on the Mediterranean?	Greatest railway center in the world? Distance from New York to Liverpool (in round numbers)? Southermost city in the United States?	Leading city of South America? Largest of the continents? Foremost manufacturing city of the United States?

Tests and Examinations

In spite of the occasional attacks made upon examinations, they are used in practically every school, college, and university. They are an essential and a highly valuable part of the intellectual discipline of the school, though no one defends using the results of an examination as the sole basis of promotion. The nervous strain which may well be objected to in the case of certain high-strung children is seldom serious in grade school examinations, though it often is in more advanced classes where the examination is long, difficult, and highly important. The greatest benefit of the written examination to pupils is achieved before the examination occurs—namely in preparing for it. The second greatest benefit is to the teacher in revealing to her how well or how poorly she has taught.

One of the most beneficial examinations that I ever took was conducted thus: the teacher had prepared with much care thirty-

five very comprehensive questions. He gave these questions to the class a week in advance of the examination saying, "I shall select my examination questions from this list; if you can prepare to answer these thirty-five questions perfectly, you can get 100 in your final examinations." We were delighted; now we could review the term's work with full confidence that every effort we made was directed straight at the questions which were to appear in the examination. The definiteness of the task made it attractive, and we went at it with zest and confidence. We found that the questions covered thoroughly the essentials of the whole term's work; the teacher knew what he was doing, and his class got nearly as much good out of that week's intensive study, as it got out of the preceding twelve weeks of desultory work. I have frequently employed the method and always with satisfaction; providing, of course, that care and good judgment were exercised in preparing the questions.

PRUSSIANIZED GERMANY*

I SPEAK as one who has seen the spirit of the Prussian governing class at work from close by, having at its disposal and using to the full practically every agency for moulding the public mind.

I have watched it proceed with relentless persistency and profound cunning to instill into the nation the demoniacal obsession of power-worship and world-dominion, to modify and pervert the mentality—indeed the very fibre and moral substance—of the German people, a people which until misled, corrupted and systematically poisoned by the Prussian ruling caste, was and deserved to be an honored, valued and welcome member of the family of nations.

I have hated and loathed that spirit ever since it came within my ken many years ago; hated it all the more as I saw it ruthlessly pulling down a thing which was dear to me—the old Germany to which I was linked by ties of blood, by fond memories and cherished sentiments.

The difference in the degree of guilt as between the German people and their Prussian or Prussianized rulers and leaders for the monstrous crime of this war and the atrocious barbarism of its conduct is the difference between the man who, acting under the influence of a poisonous drug, runs amuck in mad frenzy

*From an address by Mr. Otto H. Kahn of New York before the Harrisburg, Pa., Chamber of Commerce, September 26, 1917. Reprinted by permission.

and the unspeakable malefactor who administered that drug, well knowing and fully intending the ghastly consequences which were bound to follow.

THE world fervently longs for peace. But there can be no peace answering to the true meaning of the word—no peace permitting the nations of the earth, great and small, to walk unarmed and unafraid—until the teaching and the leadership of the apostles of an outlaw creed shall have become discredited and hateful in the sight of the German people; until that people shall have awakened to a consciousness of the unfathomable guilt of those whom they have followed into calamity and shame; until a mood of penitence and of a decent respect for the opinions of mankind shall have supplanted the sway of what President Wilson has so trenchantly termed "truculence and treachery."

God strengthen the conscience and the understanding, the will and the power of the German people so that they may find the only road which will give to the world an early peace and in time lead Germany back into the family of nations from which it is now an outcast.

From each successive visit to Germany for twenty-five years I came away more appalled by the sinister transmutation Prussianism had wrought amongst the people and by the portentous menace I recognized in it for the entire world.

It had given to Germany unparalleled prosperity, beneficent and advanced social legislation, and not a few other things of value, but it had taken in payment the soul of the race. It had made a "devil's bargain."

AND when this war broke out in Europe I knew that the issue had been joined between the powers of brutal might and insensate ambition on the one side and the forces of humanity and liberty on the other; between darkness and light.

Many there were at that time—and amongst them men for whose character I had high respect and whose motives were beyond any possible suspicion—who saw their own and America's duty in strict neutrality, mentally and actually, but personally I believed from the beginning of the war, whether we liked all the elements of the Allies combination or not—and I certainly did not like the Russia of the Czars—that the cause of the Allies was America's cause.

I believed that this was no ordinary war between peoples for a question of national interest, or even national honor, but a conflict between fundamental principles and ideas; and so believing I was bound to feel that the natural lines of race, blood and kin-

ship could not be the determining lines for one's attitude and alignment, but that each man, regardless of his origin, had to decide according to his judgement and conscience on which side was the right and on which was the wrong and take his stand accordingly, whatever the wrench and anguish of the decision. And thus I took my stand three years ago.

BUT whatever one's views and feelings, whatever the country of one's birth or kin, only one course was left for all those claiming the privilege of American citizenship when after infinite forbearance the President decided that our honor and safety demanded that we take up arms against the Imperial German Government, and by action of Congress the cause and the fight against the Government were declared our cause and our fight.

The duty of loyal allegiance and faithful service to his country, even unto death, rests, of course, upon every American. But, if it be possible to speak of a comparative degree concerning what is the highest as it is the most elementary attribute of citizenship, that duty may almost be said to rest with an even more solemn and compelling obligation upon Americans of foreign origin than upon native Americans.

For we Americans of foreign antecedents are here not by the accidental right of birth, but by our own free choice for better or for worse.

We are your fellow citizens because you accepted our oath of allegiance as given in good faith, and because you have opened to us in generous trust the portals of American opportunity and freedom, and have admitted us to membership in the family of Americans, giving us equal rights in the great inheritance which has been created by the blood and the toil of your ancestors, asking nothing from us in return but decent citizenship and adherence to those ideals and principals which are symbolized by the glorious flag of America.

Woe to the foreign-born American who betrays the splendid trust which you have reposed in him!

Woe to him who considers his American citizenship merely as a convenient garment to be worn in fair weather but to be exchanged for another one in time of storm and stress!

Woe to the German-American, so-called, who, in this sacred war for a cause as high as any for which ever people took up arms, does not feel a solemn urge, does not show an eager determination to be in the very fore-front of the struggle; does not prove a patriotic jealousy, in thought, in action and in speech to rival and to outdo his native-born fellow citizen in devotion and

in willing sacrifice for the country of his choice and adoption and sworn allegiance, and of their common affection and pride.

AS Washington led Americans of British blood to fight against Great Britain, as Lincoln called upon Americans of the North to fight their very brothers of the South, so Americans of German descent are now summoned to join in our country's righteous struggle against a people of their own blood, which, under the evil spell of a dreadful obsession, and, Heaven knows, through no fault of ours, has made itself the enemy of this peace-loving Nation, as it is the enemy of peace and right and freedom throughout the world.

To gain America's independence, to defeat oppression and tyranny, was indeed to gain a great cause.

To preserve the Union, to eradicate slavery, was perhaps a greater still.

To defend the very foundations of liberty and humanity, the very groundwork of fair dealing between nations, the very basis of peaceable living together among the peoples of the earth against the fierce and brutal onslaught of ruthless, lawless, faithless might; to spend the lives and the fortunes of this generation so that our descendants may be freed from the dreadful calamity of war and the fear of war, so that the energies and billions of treasure now devoted to plans and instruments of destruction may be given henceforth to fruitful works of peace and progress and to the betterment of the conditions of the people—that is the highest cause for which any people ever unsheathed its sword.

He who shirks the full measure of his duty and allegiance in that noblest of causes, be he German-American, Irish-American, or any other hyphenated American, be he I. W. W. or Socialist or whatever the appellation, does not deserve to stand amongst Americans or, indeed, amongst free men anywhere.

He who, secretly or overtly, tries to thwart the declared will and aim of the Nation in this holy war is a traitor, and a traitor's fate should be his.

TEACHING OF HISTORY AND GEOGRAPHY

Gideon Thayer, Principal of Chauncey Hall School, Boston, wrote in the American Journal of Education, in 1860: "There is not, perhaps, in the whole range of studies introduced into our schools, one so suggestive as that of Geography.......I would further maintain that Geography and History should not be separated but be always studied and taught together."

THE IMPORTANCE OF GEOGRAPHIC FACTORS IN THE BIRMINGHAM, ALA., IRON DISTRICT

By Charles W. Cook
University of Michigan, Ann Arbor

Introduction

THE rise of the Birmingham district in the iron and steel industry calls attention to the importance of the geographic factors in determining the value of an ore deposit. These include the character of surface features and of drainage and the location of raw materials with reference to each other and to markets. When the unfavorable location of Birmingham with respect to a large market, and the relatively low tenor of the ores as compared with those of the Lake Superior region, which furthermore has the benefit of water transportation, are considered, it is immediately apparent that the Birmingham district must possess some very favorable factors to offset these serious disadvantages.

It is the purpose of this paper to summarize those facts about the Birmingham district which have received treatment in various articles and also to contribute some information concerning factors which have not been discussed in print. In order that the conditions may be more clearly understood, a brief outline of the geologic and physiographic conditions of the district is presented.

Geologic and Physiographic Conditions

The iron ore minerals which are employed in the production of iron and steel in the Birmingham district are hematite and limonite, the deposits of the former being the more important of the two and the ones which have been more largely involved in the growth of the industry. The city of Birmingham, from which the district takes its name, lies a little north of the center of the state of Alabama in the middle portion of the Birmingham Valley, which extends northeast and southwest for a distance of about 35 miles from the city of Birmingham. The district includes not only the Birmingham Valley but also small areas on each side of the valley, giving a total area of about 700 square miles. Birmingham Valley, which is at the southern end of the Appalachian Mountains, is bounded on the southeast by Shades Mt. and on the northwest by Sand Mt., toward the southern end of the valley called Rock Mt. Within the valley are a number of minor ridges having the same general trend as the valley. Of

these ridges the most important is Red Mt., on the east side of the valley. It carries the principal hematite ore bodies being worked at the present time, the most productive portion extending from north of Birmingham to south of Bessemer, a distance of about 25 miles. The general altitude of the valley floor is between 500 and 600 feet above sea-level, being 630 feet at the Louisville and Nashville Railroad station in Birmingham, while the ridges range from 700 to over 1,300 feet in elevation. With respect to the general region, the Birmingham Valley acts as a watershed, the streams flowing east and west having cut gaps in the ridges bounding the valley. Thus it is evident that the Birmingham Valley is both a drainage basin and a watershed.*

The Effects of the Geographic Factors

As indicated above, the Birmingham valley is both a drainage basin and a watershed. The gaps through the ridges which bound the valley therefore give ready access to Birmingham from the outside world, and a down-grade haul to the sea coast. This

*Geological Note.—The geological section of the district consists of a series of limestones, shales and sandstones ranging in age from Cambrian to Pennsylvanian and exhibiting no pronounced unconformities. These sediments have been folded into a great anticline trending northeast and southwest and have been subjected to considerable faulting, in some instances bringing the oldest formations into contact with the youngest, as along the west side of the valley, where in the vicinity of Birmingham many or all of the intervening formations have been cut out.

The Birmingham Valley has been eroded in the crest of the anticline so that the rocks dip away from the valley to the northwest and southeast, and outcrop in the bottom and along the sides of the valley. The dip of the beds tends to decrease rather rapidly, especially to the northwest, at a short distance from the valley. The lower members are of Cambrian and Ordivician age and are made up principally of limestones and dolomites. These beds outcrop mainly in the bottom of the valley and along the lower slopes. Above this great thickness of limestones and dolomites and outcropping along the west side and near the crest of Red Mt., as well as along the west side of the valley, except where cut out by faulting, is the Rockwood (Clinton) formation of Silurian age. This formation carries the hematite ore beds and is composed of lenses of sandstone and shale, together with four prominent seams of ore, not all of which are workable at any one point. Above the ore-bearing formation is a thin black shale of Devonian age and above that a series of chert, sandstone, limestone, and shale formations of Mississippian age, only the lower member (Ft. Payne) of which is of economic importance, it being quarried and used for road material. Above the Mississippian rocks and outcropping near the crest of the mountains on either side of the valley is the Pottsville group of Pennsylvanian age. This group carries the coal bearing beds of the district. The Warrior coal field which extends westward from the Birmingham Valley has an area of over 7,000 square miles and supplies excellent grade of coking coal. On the east side of the valley lies the Cahaba coal field with an area of 150 square miles. Although the coals from the Cahaba field are also coking coals, they are not as satisfactory for that purpose as the Warrior coals and so are not used in the production of coke. They are however superior to the Warrior coals for domestic purposes.

has probably been an important factor in locating the city of Birmingham.

The combined effect of the folding and erosion of the rocks of the district has been to expose at the surface deposits of all of the raw materials required for the production of pig iron. These materials may be found within a radius of not over three miles, although the haul to the furnace is generally more than this on account of the location of specific properties. The dolomite which is used most largely for the flux is found in the bottom of the valley, with the hematite ore and the fuel higher up on the slope, on opposite sides of the valley. This combination of geologic occurrence and topographic position has resulted in easy and cheap mining and short transportation for the raw materials.

Furthermore, there is a tendency to locate the blast furnaces in the valley near the supply of flux and where advantage may be taken of the down-grade haul for the fuel and ore, especially the latter. It is evident that gravity aids in the solution of the transportation problem, beginning with the raw materials at the mines and ending with the delivery of the finished product at the sea-board.

The variation in the nature of the impurities in the hematite ores of the district results in a rather wide range in tenor of ore which may be mined at a profit. The minimum tenor which is permissible under ordinary conditions of market, etc. may be given as 27—40% iron, which on a percentage basis makes these ores much lower grade than the marginal ores of the Lake Superior region. In the Birmingham district, where the ores have to be transported but a short distance, the effect of this difference in tenor is more apparent than real as the workable ores with a tenor approaching the lower value given above carry lime as their most prominent impurity. Since this substance must be added to the higher grade ores in smelting them, the iron content per ton of blast furnace charge often approaches that of the higher grade Lake Superior ores. However, when the ores carry silica as the chief impurity and it is necessary to add a flux in reducing them, the marginal tenor then approaches the maximum value given above.

Ores which carry as an impurity a sufficient amount of lime to flux them are known as self-fluxing ores. Many of the Birmingham ores are not only self-fluxing but carry excess of lime. It is in connection with such hematite ores that the limonite or "brown ore" deposits which occur in the southern portion of the valley have played a part in the development of the district. The

limonite deposits within the district, although they do not supply the entire production of this type of ore which is smelted there, are located in the southern portion of the Birmingham Valley in the vicinity of Woodstock. The limonite occurs here as irregular deposits or pockets in the clays and for the most part associated with the Coosa and Knox formations (of Cambrian and Cambro-Ordovician age). These deposits are very irregular in form and variable in dimensions so that they would scarcely be suitable as a basis for the establishment of a large iron and steel industry. Their high iron content, especially after concentration, makes them valuable in the smelting of the hematite or of "red ores" carrying an excess of flux. Furthermore they carry an appreciable amount of manganese and so improve the quality of the pig iron for certain purposes.

It seems quite probable, therefore, that not only have the limonite ores in this way improved the value of the hematite ores but also that the presence of the hematite ores has increased the value of the limonite ores by furnishing a more substantial basis for the erection of blast furnaces of large capacity.

In the note on the geology of the district it was pointed out that the older formations which lie in the bottom of the valley and on the lower slopes of the ridges are composed of limestones and dolomities. Up to the present time the Ketona member of the Knox dolomite has furnished most of the fluxing material as the dolomite is more satisfactory as a flux than the limestones of the district. The smelting industry in the district seems now to be approaching a transition point when the limestone will supplant the dolomite for this purpose, as indicated in the following paragraph.

One of the problems which confronts the blast furnace operator is the disposal of the slag. So long as land is cheap the problem is not a serious one but when land becomes dear then relief of some sort sooner or later is necessary. In the Birmingham district a considerable amount of slag has been disposed of for road material, etc., but this outlet is not sufficient to keep pace with the slag production of a growing iron industry. Therefore some other means of disposal must be sought. The manufacture of cement has offered such a possibility, in fact, it offers a possibility of turning a former loss into a profit. However, the dolomite slag is not satisfactory for the manufacture of cement on account of the high magnesia content, and so the use of limestone intead of dolomite as a flux has already been initiated in order that the slag may be used in the manufacture of cement. This is an excellent illustration of the possibilities for adaptation to new conditions which the district possesses.

That the factors discussed above have had a real and important bearing upon the net value of the hematite deposits of the Birmingham district is plainly apparent when it is considered that the price per ton of ore at the mine in 1914, before the war had exerted a decided effect upon prices, was $1.21 as compared to $1.74 for Minnesota and $2.19 for Michigan, while for 1913 the discrepancy was even greater, the values being; Alabama, $1.18; Michigan, $2.64; and Minnesota, $2.21. (United States Geological Survey.)

The mineral resources of the district which have thus far been discussed by no means limit its possibilities. Many promising prospects of other mineral deposits have been located within relatively short distances of Birmingham, such as talc, marble, graphite, etc. Prospects for oil and gas are considered sufficiently good to warrant a number of large companies in undertaking careful explorations. The discovery of oil and gas would be a decided benefit to the iron and steel industry, especially in connection with the manufacture of cement.

MEASURING THE ABILITY OF CHILDREN IN GEOGRAPHY

By E. E. Lackey
State Normal School, Wayne, Neb.

The Need of a Measuring Stick

THE ability of children in geography has been measured in the past, to be sure, but always in terms of subjective standards that vary with teachers and schools. The results of such measurements can have little value in co-operative schemes for improving geography instruction. For this purpose an objective measuring stick is needed whereby the ability of children in geography may be measured and expressed in units that mean the same thing to everybody, thus affording a common basis for comparison and co-operation. The "Hahn-Lackey Scale for Measuring the Ability of Children in Geography" is such an objective scale. Its use will be detailed later, but a study of the scale itself will first be given.

Selection of Questions and Exercises

With six of the modern textbook series at hand, separate lists of questions and exercises were made out covering all phases of geography work treated in these books. In all there were

about six hundred of these questions and exercises. It was constantly kept in mind in the selection that the rational or thought side of geography deserves at least as much attention as the memory phase. It was found that many of the questions and exercises in the original lists could be eliminated. Some were considered ambiguous, some were duplicated in other lists, some were near duplicates and some were relatively unimportant. Many of the exercises had to be revised because of language difficulties. Some were made shorter, some were rid of technical terms in order to simplify them, while others were retaind because they tested knowledge of geographical terms. When the culling and refining process was completed many of the original questions and exercises had been eliminated.

Constructing the Scale

For convenience in giving the tests and in order not to weary the children, the remaining questions and exercises were divided into nine lists of about twenty-five each. These lists were given as tests to the children in twelve Nebraska and Iowa schools at the close of the school year. One thousand six hundred ninety-six pupils took these tests, distributed among the fourth, fifth, sixth, seventh, and eighth grades. The answer papers were read and scored by the authors—about 283,100 answers in all. The judging of the difficulty of each of these questions and exercises was left entirely to the children. On the basis of these answers the questions and exercises were grouped into twenty-five graded lists, ranging consecutively from the most difficult to the least difficult. The letters of the alphabet, in their ordinary sequence, were used to designate these lists, the most difficult being called "Step A'' and the least difficult "Step Y". The answers, consequently, placed the questions and exercises in their proper relationship to each other as to comparative diffculty. To make the questions and answers in each step equal in difficulty only such ones as were given approximately the same value by the same school grades were placed in the same step. To be exact, in no case does the absolute value of a question or exercise deviate from the approximate by more than four-tenths of a step, and this only in a very few cases. Expressed in per cent, this means that the given value, say in "Step P", 73 represents values from 70.2 to 75.4; 58 represents values from 54.8 to 61.2; 50 represents values from 46.8 to 53.2; and 34 represents values from 31.2 to 37.2. The difference between consecutive steps is also approximately equal.

Range of Subject-matter Covered by the Tests

The 216 questions and exercises in the scale involve the materials of geography in approximately the following proportions: home geography, thirty-eight; mathematical, twenty-six; locative, seventy-four; human, eighty-eight; principles, one hundred thirteen; physical, ninety-four; climate, seventy-two; historical, eight; commercial, thirty-four; industrial and economic, eighty; state, five; North America, eighty-one; South America, nineteen; Europe, twenty-six; Asia, twenty-six; Africa, fourteen; Australia, seven; comparative, twenty-nine. Other classifications would show an increased variety; e. g., observational, descriptive, representative, plant, and animal geography, and would yield a large number of questions and exercises in each list. However, this scale in no sense should be taken to represent a complete list of minimum essentials in geography. It was the aim to make the questions and exercises a test on materials worth while in geography, and taken in this sense they would merely be a test on the minimum essentials.

Questions and Exercises of "Step P" of the Scale

79. *Name two large rivers of South America.*
80. *What two important products are brought to us from Brazil?*
88. *How can you get from New York to London, and in what direction would you go?*
89. *How can steamboats go from New York to San Francisco by the shortest route?*
100. *Name the chief occupation of the people of Australia.*
105. *Give two reasons why mountainous regions are not good for farming.*
28. *How can we tell how big a country is by studying a map?*
10. *How long does it take the earth to go around the sun?*
67. GIVE THE PRINCIPAL REASON WHY SUCH DENSE FORESTS GROW ALONG THE AMAZON.
70. WHICH PART OF THE UNITED STATES IS MOST IMPORTANT FOR MANUFACTURING, AND WHICH FOR AGRICULTURE?
71. WHERE MAY SNOW BE FOUND IN THE HOT BELT, NEAR THE EQUATOR?
77. WHY IS THERE SO LITTLE RAINFALL IN THE GREAT BASIN OF THE UNITED STATES?
78. NAME ONE WAY IN WHICH THE PANAMA CANAL WILL BE AN ADVANTAGE TO THE UNITED STATES IN ITS TRADE WITH SOUTH AMERICA.

81. DURING WHAT MONTHS DOES ARGENTINA HAVE WINTER?
82. IN WHAT INDUSTRY OR KIND OF WORK ARE MOST OF THE PEOPLE OF ENGLAND ENGAGED?
31. WHY DO SO FEW PEOPLE LIVE IN DESERTS?

According to the scale an average fourth grade pupil ought to make 34% on the questions and exercises of this step or any part of it. A fifth grade pupil ought to make 50%, a sixth grade pupil 58%, and a seventh or eighth grade pupil 73%.

In the scale, the questions and exercises in italics are the ones which test the memory, and the ones in small capitals are thought-provoking. The first eight questions and exercises in "Step P" belong to the former, and the last eight to the latter.

In all there are from fifteen to twenty tests of ten exercises each in this scale. About half of these may be made memory tests if desired and the others tests on rational geography.

SOME USES OF THE SCALE

There are several uses that can be made of a scale of this kind, some of which are given below:—

1. *To measure a pupils ability in geography for his promotion or classification.* If he answers correctly 73% of the exercises in "Step P" he is ready for the eighth grade. If he answers 58% correctly, he may be promoted to the seventh grade; 50%, to the sixth grade; 34%, to the fifth grade. In like manner each of the other steps of the scale may be used to determine the grade to which a pupil belongs.

2. *To measure the ability of a class as a whole for comparison with the standard given in the scale.* On a test taken from the list of questions and exercises in "Step O", the average score of a seventh grade at the close of the year should be 66%; that of a sixth grade, 50%; that of a fifth grade, 42%; and that of a fourth grade, 27%. Likewise each step in the scale may be used for comparing the ability of a class with the standard.

3. *To compare the progress of a year's work in geography for comparison with the normal progress shown by the scale.* During the year, a fifth grade class should advance two steps in terms of the scale; a sixth grade class, one step; and a seventh grade class, two steps.

4. *To measure the balance between the different phases of geography work.* The questions and exercises of the scale cover all phases of subject-matter treated in recent text-books on geography. By studying the nature of the exercises missed by her pupils in the various tests, the teacher may discover to what phase of work she should give more attention. Especially is this

true in the arrangement of the data of the scale for the purpose of testing the balance between memory work and thought work.

5. *To measure the merit of different methods of instruction and of school organization.* It furnishes a scientific basis for determining the value of such work as map drawing, laboratory exercises, field work, problem assignment, use of stereoscopes, lanterns, etc. Of all the elementary school subjects, geography is undoubtedly the best for testing the value of departmental instruction and supervised study. It may also be used to study individual differences among pupils of the same school grade, and the overlapping of grades. For all such experimental work this scale gives new and larger opportunities.*

*Editor's Note. Copies of the Hahn-Lackey Geography scale with its list of graded questions may be obtained by sending 7 cents to E. E. Lackey, Normal School, Wayne, Nebr.

GEOGRAPHY IN THE JUNIOR HIGH SCHOOL*

By James H. Smith

Austin High School, Chicago, Ill.

At THE 1916 meeting of the Central Association of Science and Mathematics Teachers a committee report was given upon "Earth Science in the Reorganized (Junior-Senior) High School." This report set forth a tentative course of geography and related sciences, running from the seventh to the twelfth grades inclusive.[1] Since that report was given conditions in our country and in the world have changed seriously. We may fairly raise the question whether these changes demand that our proposed course in geography be maintained, altered, or entirely abandoned. At this time certainly no one would argue for a place in our schools for any subject that is not vitally connected with the lives of the people.

The Junior High School movement is making rapid progress in the schools of our country. Its present status is perhaps best set forth by Aubrey A. Douglass in Part III of the Fifteenth Year Book of the National Society for the Study of Education. In this we find that already 136 cities and towns in 38 states have these schools "in operation,"[2] while many other cities and towns have them partly organized or have plans for their establishment in the near future.

1—Proceedings of the Sixteenth meeting of Central Association of Science and Mathematics Teachers, pp. 127-128.

2—Fifteenth Year Book National Society for the Study of Education, pp. 140-5.

*Read at the Columbus, Ohio, meeting of Central Association of Science and Mathematics Teachers.

Selecting seventy-five of the best of the Junior High Schools a table is given showing subjects offered. As to Geography we find the following:

7th grade geography required in 51 schools
7th grade geography elective in 3 schools.
8th grade geography required in 17 schools.
8th grade geography elective in 1 school.
9th grade geography required in 1 school.
9th grade geography elective in 1 school.

Here we see a conspicuous lack of continuous, required geography. Practically all schools require a year of geography in either the seventh or eighth grade, and stop at that. Nor do they require other sciences in these three grades. Only forty-two schools require any other science, and these forty-two scatter it over the field, including general science, agriculture, physiology, botany, and zoology. Living in a scientific age these schools, recently reorganized and supposed to be progressive, postpone the introduction of the study of science until after the ninth grade. In discussing the "Principles underlying the Reorganization of the Several Subjects" geography is not listed. This means that either it is not to be given at all, or it is to be treated as at present in the grades of our schools. One ray of light penetrates this dismal situation. Sixteen schools require either in the seventh or eighth grade History and Geography; History, Civics and Geography; or Civics and Geography.

This implies that geography is to be given its application and its social significance. It is possible that in the social aspects of geography will be found its greatest field for usefulness, rather than its physical aspects which have been emphasized in the past.

In its report last year your committee said "There can be no defense of a high school course that leaves its graduates grossly ignorant of the countries, and peoples, and cities, and industries of the world with which their lives are vitally connected." Today this is true in a more imperative sense than ever before. Whether it be in conflict, or in statesmanship, or in commercial endeavor—the boys and girls who are now of early high school age more than any generation before them need an intimate knowledge of the earth and its inhabitants. Even the leaders among the administrators of our schools seem to be oblivious of this fact. As was well said in the discussion at our last meeting, the executives must be interested, teachers must be filled with enthusiasm and with an abiding interest, and the public in general must be convinced of the fundamental importance of this branch of education.

THE TIDES OF THE BAY OF FUNDY

THE tides of the Bay of Fundy are unequalled in height anywhere in the world, but they are not so high as they are more or less commonly supposed to be. The bay itself lies between New Brunswick and Nova Scotia; it is 145 miles long by 48 miles wide at the mouth, and converges toward the head like a funnel. The direction and shape of the Bay of Fundy is the chief factor in making these tides of exceptional range. The coast of Maine sweeps around to the northeast in a broad curve and terminates in the land-locked Bay of Fundy. The tidal wave comes from the southeast and is forced into the funnel-shaped bay. During its progress its velocity is always increasing. As it sweeps up the Bay of Fundy the water is piled up higher and higher, as the bay narrows until it reaches a height above mean low tide of 50.5 feet at the spring tide, and 37.4 feet at the neap.*

As the tide advances, a bore or crest of water, rushes swiftly up the inclined bed of mud. Sometimes this foaming bore is not over one's shoe tops; again if there is a strong wind from the south or southwest, it may rise to a height of six or seven feet.

After the bore has passed, the tide flows in like a silent but resistless river at the rate of three or four miles an hour. The water rises for six hours at the rate of about two inches a minute, and fills the mouths of the tributary streams from 10 to 30 feet deep. At the mouth of the St. John's river, in New Brunswick, there is a cataract where the river falls into the bay; but at high tide the water rises over the top, so that the falls are reversed and the water flows from the bay into the river. When the flood tide is changing to ebb, there are about fifteen minutes of calm when vessels may take advantage of the high water and go over the falls with perfect safety. On a smooth, slightly inclined shore boats may be carried up by the impetus of the tide without danger. At points on the Nova Scotia shore where there are tidal flats 12 miles broad exposed at low tide, ships can be run up on the flood tide and after the water retreats, they are left high and dry as if on a dry dock until the next flood, 12½ hours later.

Although the average height of the spring tide *above low water level* is 50 feet, there have been times when the tide was much higher. In 1869 at the time of the great Saxby storm the tide rose to 60 or 70 feet. The figures for the Saxby storm tides are often quoted for the normal height of the Fundy tides, but such tides

*Bowditch, "American Practical Navigation, 1914, p281.

occur only very rarely and are produced by a violent storm from the south. The following table shows a comparison of the Bay of Fundy tides with certain others.

Place	Range	
	Spring	Neap
Bermuda Island (about same as open sea)	4.0 feet	2.6 feet
New York Navy Yard	5.3 feet	3.4 feet
Portland Custom House	10.1 feet	7.3 feet
Boston Navy Yard	11.0 feet	8.1 feet
Burntcoat Head (Highest Tide in Bay of Fundy)	50.5 feet	37.4 feet

The extensive marshes around the Bay of Fundy are the direct effect of the tides. The marshes were first utilized by the Acadians who built stone and mud dikes to keep out the sea. In Nova Scotia and New Brunswick there were, as early as 1875, 120,000 acres of diked marshes, which are converted into fertile fields, especially adapted for growing hay.

F. W.

TEST QUESTIONS—ECONOMIC GEOGRAPHY OF THE U. S.

1. Three coal fields in the U. S. produce most of our coal; locate them definitely.

2. Five states in the Union are very large producers of petroleum; name them.

3. A major part of the cotton mills of the United States are in two rather limited sections of the country; what are they?

4. Only three states are very large producers of beet sugar; what are they?

5. Three-fourths of the copper mined in the United States comes from small areas in three states; name the states.

6. Four of the five leading shoe manufacturing cities are in one state; what state?

7. Most of the cane sugar produced in the United States comes from one state; what is it?

8. The forest regions of the United States may be grouped into five major belts; where are they?

9. There are seven cities of 100,000 or more people on the Great Lakes; name and locate them.

10. There are four such cities on the Mississippi River; name them.

11. California and Washington have three large cities each; name and locate them.

12. Six railroads extend from the Mississippi Valley to the Pacific Coast; name them.

13. One part of one state produces more than one-half of all the iron ore mined in the United States; what state? What part?

14. About half of the foreign commerce of the United States passes through one port; what is it?

15. One small part of one state produces substantially all of the hard (or anthracite) coal mined in the United States; locate it.

16. Only one river of the Mississippi system is very much used for navigation; what one is it?

17. Two states of the Union produce over 100,000,000 bu. of wheat each; name them.

18. We raise three crops each having in normal times a greater annual value than our wheat crop; what are they?

19. We produce only one-twentieth of the sugar that we consume; where do we buy most largely?

20. In times of peace, three countries buy nearly one-half of our exports. What are these countries?

21. About half of the ready-made clothing (both for men and women) manufactured in the United States is made in one state and very largely in one city; what state and city?

22. More than half of the manufactured goods made in the United States are made in five states; name them.

23. The United States has three cities of over one million population; what are they?

24. One state in the Union produces one mineral annually worth nearly as much as all the gold produced in the world; what is the state and the mineral?

Answers to Foregoing Questions

1. (a) The Appalachian field extending from western Pennsylvania to Alabama, (largest producer); (b) the anthracite field of northeastern Pennsylvania, producing practically all of the hard coal mined in the United States: (c) the eastern interior field, mainly in Illinois but extending into Indiana and Kentucky.

2. Oklahoma, California, Texas, Illinois, Louisiana.

3. Eastern Massachusetts and Rhode Island; Piedmont region of North Carolina, South Carolina, and Georgia.

4. Colorado, California, Michigan.
5. Arizona, Montana, Michigan.
6. Massachusetts, around Boston.
7. Louisiana.
8. (a) Northern pine belt extending from Maine westward to Minnesota, (b) Southern pine belt, along the coastal plain from New Jersey to Texas, (c) the central hardwood belt, the larger part of which has been cut over, (d) the Rocky Mountain belt, mainly pines, (e) the Pacific slope forests in which fir and cedar are dominant.
9. Buffalo, Cleveland, Toledo, Detroit, Milwaukee, Chicago, Toronto.
10. Minneapolis, St. Paul, St. Louis, New Orleans.
11. San Francisco, Los Angeles, Oakland, Seattle, Spokane, Tacoma.
12. Great Northern, Northern Pacific, Chicago, Milwaukee and St. Paul, Union Pacific, Santa Fe, Southern Pacific.
13. Northeastern Minnesota.
14. New York.
15. Northeastern Pennsylvania.
16. The Ohio.
17. North Dakota and Kansas.
18. Corn, hay, cotton.
19. Cuba, Hawaii, Java.
20. Great Britain, Germany, Canada.
21. New York City and State.
22. New York, Illinois, Pennsylvania, Massachusetts, Ohio.
23. New York, Chicago, Philadelphia.
24. Pennsylvania, coal.

MEETING OF KANSAS AND WASHINGTON COUNCILS

The following is a program of the Kansas Council held in Topeka, November 9th:

"Methods in Elementary Grades," ......JANE K. ATWOOD
"Socializing Geography in the Junior High School,"
.....................H. E. CHANDLER, JUNCTION CITY
"The Climate of Kansas," ....S. D. FLORA, TOPEKA

The following officers were elected for the coming year:

President—Miss Jennie Williams, Emporia, Kan.
Vice President—Miss Georgia Stipp, Wichita, Kan.
Secretary—Miss Bessie Bixby, Lawrence, Kan.

The meeting of the Washington Council was held October 26th at Tacoma. The program consisted of *"Essentials in the Teaching of State Geography,"* E. J. Saunders, University of Washington. Newly elected officers were:

State Director—J. E. Buchanan, Cheney.
Sec'y. and Treas.—E. H. Golisch, Seattle.

MEETING OF THE MARYLAND COUNCIL

The Maryland State Geography Council met in a sectional meeting with the State Teachers' Association on Sept. 27, at 2 p. m., in the Teachers' Training School in Baltimore. The Teachers' Training School had on exhibition a very interesting and instructive exhibit of the work of the school. There were nearly a thousand teachers present. The following program was given:

2:30—3:30: *"Short Talks on Personal Experience with Various Phases of Geography Teaching."* Leader, Mrs. Nan Mildred Mosteller, Supervisor of Frederick Schools.

"The Geography of the Intermediate Grades"—Miss Margaret Duvall, Frederick County.

(a) Method of Approach.
(b) Project—Problem Method.
(c) Use of Text Book and Reference Book.
(d) Discussion.

"The Geography of Grades 6 and 7"—Miss Edna Schaffer, Frederick County.

(a) The Basis of Work in These Grades.
(b) How Problem Geography Has Motivated My Work.
(c) Relation of Geography to Other Work.
(d) Discussion.

Miss Edna M. Marshall of the Maryland State Normal School, Frostburg, Md., presided.

Ernest E. Race, Md. State Normal School, Director.

Correction

On page 150 of the December magazine, the distance from Boston to New York was given as 1,000 miles; it should have been 230 miles.

MASSACHUSETTS MEETING OF GEOGRAPHY TEACHERS

The Annual Meeting of the Massachusetts Branch of the National Council of Geography Teachers was held Saturday, November 17th, at the Boston Public Library. The lecture hall was filled with teachers, masters, and superintendents who are especially interested in promoting geography throughout the state. President L. O. Packard presided, and the program was as follows:

> "*Humanizing School Geography.*" By Professor Richard E. Dodge.
>
> "*Mature Geography in Europe and America and Its Relation to the Training of Teachers.*" By Professor Albert P. Brigham, Colgate University.
>
> "*The Significance of Geography in Elementary Education.*" By Wallace W. Atwood, Harvard University.

Professor Dodge made an exceedingly strong appeal for the emphasis of human geography with children, and Professor Brigham, through his knowledge of conditions in Europe, gave a most delightful address. Reports were received from the Secretary and Treasurer, and from Mr. Cushing as chairman of the committee on Geography in the Junior High Schools.

During the past year, through the activities of the local organization, geography has been represented on the programs of most meetings of the county teachers' associations. Special requests have come from distant parts of the state, and whenever possible speakers have been provided. A special meeting will be held on December 8th at Worcester, when Mr. Leonard O. Packard and Mr. Wallace W. Atwood will speak, and later in the year a similar meeting will be conducted at Lowell. The committee on Geography in the Junior High Schools has prepared a special report which is in course of publication, and the introduction of geography into the curriculum of the junior high schools in Boston has also been accomplished. The local organization is very much encouraged by the increased interest in geography which is felt throughout the State and throughout the world at this very critical time.

The membership in the local branch now numbers 182, an increase over last year of 62.

WALLACE W. ATWOOD, Secy.-Treas.

PROMINENT EDUCATORS OF SOUTHERN CALIFORNIA TALK ON GEOGRAPHY

A meeting of the Southern California branch of the National Council of Geography Teachers was held at the Los Angeles State Normal School on Saturday, November 24, 1917. The meeting was a success from three points of view—forcefulness of addresses, size of audience (upwards of 600), and number of teachers who enrolled as members of the council. Mr. James F. Chamberlain, head of the department of geography in the Los Angeles State Normal School, had charge of the meeting and was re-elected as director of the Southern California division. Miss Myrta L. McClellan was made secretary and treasurer.

The speakers were Dr. Ernest C. Moore, president of the Los Angeles State Normal School, and Dr. Albert Shiels, superintendent of the Los Angeles City Schools. Dr. Moore's subject was, *"The Place of Geography in Education."* Dr. Shiels talked on *"The Teaching of Geography in the Elementary School."*

In a short prefatory talk Mr. Chamberlain called attention to the changes that, due to the war, are taking place in the geography of the world, as well as in some of its correlates such as history and agriculture, and the obligation of the schools to adjust the teaching of geography to meet these changes. This means better qualifications of the geography teacher. Emphasis was placed upon the importance of appointing supervisors of geography in all the large cities of the United States that teachers might have the same kind of aid in this important subject as is given them in music and drawing, where supervision of untrained teachers has meant so much.

Dr. Moore made his audience feel that to live broadly and efficiently it is necessary to know the geography of the world. Geography must mean something more than the fulfilling of our little unrelated needs. Geography hitches up the whole world with general living conditions. It is fatal to lose the interrelation of great facts, the significance of important conditions. Our knowledge of geography must be comprehensive, not merely consist of that of one valley, one city, one state, one country. The integrity of any one political unit depends upon the knowledge of world conditions possessed by its inhabitants. We must know geography in order to determine what the United States must do today, and what it must do tomorrow. The Mexicans and Bolsheviki do not know what to do with their countries because they do not know their near or distant neighbors.

Dr. Shiel's talk was constructive throughout. He insists that

unless geography is taught from the view-point of the home of man a working knowledge of the subject cannot be given the children. Causal relations of conditions should be shown, yet judgment should be used as to how far it should be carried. For instance, what is good in the eighth grade might be foolishness in the third. But everywhere there should be enough opening up of a topic to make the child in the end think beyond it. As a final point Dr. Shiels emphasized the opportunity and the obligation of the geography teacher to teach sturdy patriotism, and at the same time give such an understanding of the peoples of the earth that there will grow up an appreciation among all nations of mutual help and interdependence.

RECENT PUBLICATIONS

A Textbook on the Principles of Science Teaching. By George Ransome Twiss. The Macmillan Co., N. Y., 1917. xxvi+486 pp. $1.40.

This is the most valuable contribution to science teaching in secondary schools that has yet appeared in this country. Mr. Twiss has been for many years State High School Inspector in Ohio. His special interest is in science teaching, and his years of observation in the high schools have given him a most excellent basis upon which to construct his book. The volume is a model of care and thoroughness. Each of the high school sciences (Biology, Geography, Physics, Chemistry, and General Science) is treated with a degree of insight that is remarkable. One who reads the chapters on Geography feels that the author is surely a specialist in that field, so clearly does he analyze the situation in that study, and so sanely does he offer suggestions for its effective teaching. The same quality appears to characterize the chapters dealing with the other sciences. Moreover, the book is a most practical help in its suggestions concerning equipment, reference books, supplementary material, laboratories, museums, field work, etc.

The discussion of "General Science" and the cautions which are presented are to be commended to every teacher of that difficult subject.

The Principles of Aerography. By Alexander Mc. Adie. Rand McNally & Co., Chicago. xii+318 pp. 8vo. 51 ills. 59 charts and diagrams. 1917. $3.00.

Five years have elapsed since a comprehensive treatise on meteorology appeared in this country so that the time is ripe for

the appearance of this volume devoted to the more recent advances in the science of the atmosphere.

The scope of the book is somewhat wider than the average textbook on this subject. Its chapters: a brief history of meteorology; units and symbols; temperature scales; thermodynamics of the atmosphere; stratosphere and troposphere; the circulation of the atmosphere; the major circulations; the minor circulations; forecasting storms; the winds; the water vapor of the atmosphere; condensation, dust and microbes; atmospheric electricity; precipitation; floods and notable storms; frosts; solar influences, show the ground covered and the somewhat heterogeneous treatment. Some of the subjects are very briefly treated, and references to original authorities are often omitted so that students who wish to pursue any subject farther will often be nonplussed.

There is much history and description in the book, and the more technical matters are discussed in an interesting style so that the non-technical reader will find much to attract him. The illustrations are new and have been well chosen, and are very clearly reproduced. The metric system is used throughout, a great many technical words that have not yet gained wide use even amongst professional meteorologists are used, sometimes without sufficient explanation. The author allows his zeal as propagandist to run away with him not only in the choice of a long-disused synonym for meteorology in his title, but also in employing for measures of atmospheric pressure "megabar," "kilobar," etc., instead of the "bar." "millibar," etc., adopted by the Conference of Physicists in Paris in 1900, and in general use by meteorologists at the present time.

E. R. Miller.

BOOKS RECEIVED

"Bugle Calls of Liberty," by Paul Maye Paine. Iroquois Publishing Company, Syracuse, New York.

"Suggestions of Modern Science Concerning Education," by Herbert S. Jennings, John B. Watson, Adolf Meyer, William I. Thomas. Price $1.00. The Macmillan Company, N. Y. 1917.

"First Year Course in General Science," by Clara A. Pease. Charles E. Merrill Publishing Company, 1915. Price with Manual $1.28, without Manual $1.08, Manual alone 24 cents.

"Nixie Bunny in Far-Away Lands," by Joseph C. Sindelar. Beckley Cardy Publishing Company, Chicago, Ill., 1917. Price 45c.

"PLANT MATERIALS OF DECORATIVE GARDENING: THE WOODY PLANTS," by William Trelease, Urbana, Illinois. Published by the author, 1917.

THE RISE OF RUBBER PLANTATIONS

In cultivating rubber the Malay Peninsula and the Borneo territories have played a prominent part in one of the romances of modern commerce. The story of the introduction of the Hevea brasiliensis rubber tree into Malaya, of its long neglect, its gradual adoption by planters as a possible improvement on coffee, of the phenomenal rise in the price of the commodity followed by the "boom" of 1910, is one of the most interesting in recent economic history. Those planters who had already taken up rubber-planting before the boom arrived nearly all made fortunes, while there came a rush of others to take advantage of this new-found way to wealth. Coffee estates were hastily interplanted with rubber, cocoa-nut plantations were laid waste to provide space for the new product, while some hundreds of thousands of acres of jungle land were applied for and obtained from the government to be turned into rubber plantations. All through the Federated Malay States, more especially in Selangor; in the island of Singapore, in Province Wellesley, in Johor, in British North Borneo and Sarawak, to a limited extent even in Kedah and Kelantan, at that time not yet under British rule, estates were opened up. The area actually under rubber in all the territories under review, which in 1905 amounted to some 50,000 acres, was in 1912 over 400,000 acres, the land leased for ultimate planting being some 700,000 acres. This large area was comprised in upwards of 600 estates, the capital invested in which was not less than 30,000,000 pounds. [OXFORD SURVEY OF BRITISH EMPIRE.]

WEST INDIES OFFER LARGE FIELD FOR U. S. TRADE

MORE American goods were sold to the West Indies in 1916 than to the entire continent of South America, says a report issued by the Bureau of Foreign and Domestic Commerce, of the Department of Commerce. The West Indies, including Porto Rico, took $191,195,791 worth of goods made in the United States during that year, whereas the sum total of American shipments to South America was $177,628,611.

To impress upon the American manufacturers and exporters

the extreme importance of the West Indies trade the author of the report, Special Agent Garrard Harris, makes other interesting trade comparisons for 1916. Cuba alone purchased more merchandise than Argentine, Brazil, Bolivia, Ecuador, Uruguay, and Paraguay combined. China, he says, is rightly regarded as one of the best fields for commercial effort by American exporters, yet the great oriental Republic, with its 400,000,000 population, purchased only one-seventh the amount of American goods taken by the West Indies. As a matter of fact, the West Indies took considerably more than two-thirds as much of our goods as the whole continent of Asia and all the islands of the East Indies. They took more than two and one-half times as much as Australia, New Zealand, and the rest of British Oceania. They took four and one-half times as much as all Africa. In short, the West Indies are one of the very best markets for the products of American factories, fields, and mines.

The bureau's report, which is entitled "The West Indies as an Export Field," is in reality a handbook, and the first one of its size (nearly 400 pages) designed to meet the needs of American commercial interests. Its treatment of each country and colony is comprehensive, although the commercial point of view is never lost sight of. In the section devoted to Cuba, for instance, there is a brief description of the language, currency, weights and measures, postage, and the telephone, telegraph, and wireless systems. Then a short historical sketch, following which there are chapters entitled "Location and Area," "Physical Characteristics," "Sanitation and Health," and "Population and Distribution." Next in order comes a description of the different Provinces, with a sketch of the resources, industries, transportation facilities, etc., of each. The other chapters, and they are the meat of the report so far as the American manufacturer and trader are concerned, relate to such subjects as the recent commercial progress of the country, agricultural products, fibers, stock raising, forest resources, manufacturing industries, mineral resources, mineral waters and baths, labor and wages, rents and living expenses, government and education, courts and civil laws, trade-marks and patents, lands and titles, taxation, banks and banking, foreign trade, customs tariff, commercial travelers and their samples, and concluding the section there is a chapter entitled "Summary—Outlook for the Future." Sixty-nine pages are devoted to Cuba alone. The other countries are treated in the same thorough manner, although not, of course, at the same length.

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A COMPARISON OF TRANSPORTATION ON THE MISSISSIPPI BASIN RIVERS AND THE GREAT LAKES

By A. E. Parkins
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During the three hundred years of transportation history of the waterways of the interior of the United States, man advanced from the use of the most primitive type of carrying agent, the canoe, to the highest type of vessel, the steamboat.

Types of Boats

The types in the various stages in the evolution on the Mississippi Basin rivers were slightly different, however, from those on the Great Lakes. On the rivers the flat-boat and the keel boat were antecedents of the steamboat. On the Great Lakes the order of development was canoe, batteau (similar to the keel boat), sail boat, and steamer. The flat-boat had little place on the Great Lakes because of lack of current; while the sail boat was and is of no practical value in the commerce on the Mississippi Basin rivers, because of the strong currents, the narrowness of the navigable channel, and the numerous meanders of the rivers which make frequent alterations in the course necessary. The first steamers on both rivers and lakes were in all essentials sailing vessels with boilers, engines, and paddle-wheels added. They retained not only the model, but also sails, rigging, and even the figure heads that graced the sailing vessels. The influence of environment seemed to have been strong on the interior rivers in bringing about modifications in the steamers. The non-essentials were soon dropped and the shape of hull, type of engine, and methods of propulsion were appreciably changed. On the Great Lakes, however, sails and rigging were retained on the steamers for many decades and the model of hull has received little alteration even to-day. These differences in the evolution of the present day crafts on the inland rivers and the Great Lakes are the result of the differences in the physical conditions of the waterways navigated. The present day types represent the accumulated experiences in alteration and adaptation. Let us see how the physical conditions of these two great types of waterways

have produced differences in the types of vessels navigating them. It will also be interesting to note how these physical conditions influenced the kinds of commodities carried, the management of the vessels, the kind of government improvement necessary, and the present status of commerce on these waterways.

Geographic Influence

1. *Influence of Depth of Waterways.*—The typical Mississippi River steamboat has a broad shallow hull and draws from 3 to 6 feet of water. In order to secure a displacement sufficient for an economical load, the shallow waters make it necessary for man to build his craft very wide. The river steamers are modelled in this respect after that wonderful adaptation, the flatboat or ark, that was so much used for down-stream navigation prior to the advent of the steamboat.

In striking contrast to these shallow channels of the rivers, are those of the Great Lakes and connecting waterways and harbors. Even in their natural condition the Great Lakes waterways had a minimum depth of about 10 feet*, and in recent years the government has provided a 20-foot channel connecting the lakes, and in all the larger harbors. The lake vessel has been built to fit these conditions. The typical steamers have a draught of 14 to 18 or more feet and a hull about as deep as it is wide.

2. *Influence of Changes in Depth of Water.*—Changes in depth of water as a result of shifting of sand bars and seasonal variations are of small moment on the Great Lakes waterways. Shifting bars are common in many harbors but their formation is slow and the bars offer little obstruction to the free movement of vessels. Their control is comparatively easy. Bars are not troublesome in the connecting rivers, since these rivers flow out of lakes and carry little sediment. Most of the sediment that is carried is derived from the tributary streams. The lakes also tend to reduce the seasonal variations in water level in the connecting rivers; but variations in depths in harbors as a result of wind changes are common. Such variations, however, rarely interfere with the flow of commerce.

On our inland rivers the conditions are very different. Bars are constantly being shifted, channels changed, and the depth of water varies as much as 50 feet during the year. Every rainy spell or drought for a few days brings about a change. The navigators of the rivers, therefore, are obliged to be on the alert constantly. They must possess a thorough and practical knowledge of currents, bar formation, and surface indication of bars, and even

* Not considering the rapids of the St. Mary's River and the Niagara River.

then it is necessary to take frequent soundings to find the channel, especially in the season of low water.

On the Great Lakes waterways little attention need be given by the navigators to the depth of water. Even in the connecting rivers and harbors the vessels navigate well-dredged, buoyed, and lighted channels. The navigation of the Great Lakes waterways largely consists in laying out and selecting courses and keeping on them. In the connecting rivers the courses are laid out with respect to objects on the shores, such as trees, buildings, buoys, and range lights. Running such channels with their sharp turns and heavy traffic calls for a cool headed, resourceful navigator. It calls for mathematical precision to avoid groundings and collisions. On the open lakes the courses are run by the compass and the log.

The low water and late summer interferes greatly with the sailings on the rivers. During some seasons sailings over certain sections of the river are cancelled. The consequences of such interference are disastrous to business, driving it to the railroads, and also tending to discourage tourist traffic (few people use the river steamers except for pleasure trips).

Differences in Wharves, Docks and Crews

Perhaps the most noticeable and far-reaching influence of the wide difference in the variations in depth of water on the lakes and rivers is to be seen in provisions for wharves (or docks as they are called on the lakes). On the lakes the ports have permanent docks of piling and plank, or stones or cement. The change in water level is so slight that the wharves are at a fairly constant height above water level. On the inland rivers, wharf boats, that rise and fall with the change of water level are used. Wharf boats, however, are to be found only at larger ports. At other stopping points the slight draught and flat bottom of the steamer enable it to moor along shore almost anywhere. The huge gang plank, operated by block and tackle, bridges the gap between the boat and bank. The river steamers are thus able to make frequent stops and pick up and discharge freight at numerous points.

The lake steamers, owing to their great draught, can stop only at a few points where docking facilities are especially provided. Shipping is, therefore, concentrated at definite ports. Docks may be equipped with loading and unloading machinery and freight handlers are true longshoremen. On the rivers any such devices, to be of much use, must be carried on board the boat, and freight handlers, 20 or 30 in number, are members of the crew. The paying and feeding of such a large number of men on the river steamers to handle a few tons of freight runs up

the expense account and must be an important contributing cause to the decline of steam shipping on the rivers. On the lakes each freighter carries a few deck hands (2 to 6) to aid in handling the boat at the docks, pass coal, paint, and scrub; but on the rivers the deck hands or freight handlers are not engaged in any profitable work between ports. Berths and dining tables are not provided on the river steamers for lack of room and living conditions for the crew are very unsanitary. Only a low order of workmen will ship as a freight handler on the Mississippi River steamboat. Such conditions are in striking contrast to the sanitary, comfortable quarters furnished the sailors on the lake freighters. On the lakes the concentration of traffic at a few points makes possible the erection of warehouses for freight. Even very small ports are provided with shelters. On the rivers, though all the wharf boats are provided with roofs and are, therefore, large floating warehouses, there are so few of them that most of the freight is shipped and received on the banks of the rivers and such freight is frequently exposed for several hours or days to the inclemencies of the weather. The result to most commodities is only too apparent.

At nearly all the lake ports the docks are topographically on the level with the business sections, the cities being built on lacustrine plains and not subject to flooding. The transfer of freight between the city warehouses and stores and the docks is easy. As a protection against floods, most of the cities along the rivers are built, if possible, above the high water level. Only during seasons of high water is the traffic handled on the topographic level of that of the business sections. During seasons of low water freight must be handled up and down a slope 20 to 50 feet high. This disadvantage is greater where the river is bordered by a levee, or the port is built on the river bluff. The difference in the cost of handling freight at these two terminals is no mean item.

3. *Influence of Storms.*—Storms, unless of exceptional violence, have little influence on shipping on the rivers. Boats are rarely "wind bound" or held in port as a result of high seas, nor does man feel the necessity of adjusting the model of the boat to combat the waves. The freeboard of the river boat is low and there is little bracing in the hull, for the hull is never called upon to stand the strain of riding the crest or bridging the trough of a huge wave. The flimsy structure of river steamers is shown in the havoc wrought by "sawyers" or snags. There is no need of protecting the cargo from heavy seas. It is piled up for the most part on the fore deck or on the deck beneath the superstructure.

The high seas that are common during and after every heavy wind on the lakes call for a fairly staunch craft, a high freeboard, and the protecting of the cargo from the waves. Cargoes that are likely to be harmed or washed away by the waves are stored in the holds of freighters and the hatch covers are made nearly water tight. A Mississippi River steamboat would last but a short time in one of our lake storms.

The navigators on the lakes are by necessity accomplished weather students in comparison with their compatriots on the rivers. They are not only possessed of a fair understanding of the general principles of storms, but they are close observers of the barometer, and rely to a certain extent upon practical weather proverbs, a legacy of the days before the government became the national weatherman. The river navigators, judging from recent close observation, have little more interest in the weather than the average landlubber.

4. *Influence of Physical Condition of Waterways on Types of Government Improvements.*—On the Great Lakes improvements in the channel are necessary in the connecting waterways of the lakes and in the harbors, most of the latter being at river mouths and subject to some silting. Improvements have been expensive, however, because of the great depths needed to accommodate boats that are built as a partial response to the deep waters of the lakes. The early vessels were small and had only a slight draught. But increasing commerce demanded larger vessels and these called for deeper channels. A 20-foot channel has been provided, as previously stated.

In harbors government improvements are represented chiefly by dredging where there are no rivers or where the rivers are too small to accommodate the demands of modern shipping. Where harbors were likely to be difficult to enter in times of storm, breakwaters or piers, forming artificial harbors, have been constructed. Such breakwaters are to be found at Buffalo, Cleveland, Harbor Beach, and other places.

For safeguarding the shipping, lights and buoys are freely provided. Lights and buoys along the channel of the rivers connecting the lakes are especially numerous. Navigation in these channels at night is made possible by a series of range lights. The great commerce and the great capital involved in each craft and cargo (some cargoes are valued at more than $2,000,000), the great depths demanded by the crafts, and the great momentum of the vessel with its cargo, all demand precision in navigating the connecting waters and harbors of the lakes, and also call for numerous safe-guarding devices. About the shores of the lakes, at

entrances to harbors and connecting rivers, or on headlands, islands, and at turns in the regular courses of the vessels, the government maintains numerous light houses and beacon lights, which, like those along the shores of the ocean, are of long-range visibility (10 to 20 miles).

On the inland rivers range lights are little used. Lights of a small candle power are provided along the channel, placed alternately, for the most part, at the bends. The shallow draught of the boats and the broad channels call for few buoys. At night the channel is searched out by means of the search light and an occasional sounding. The frequent changing of the channels of the rivers and the slight commerce do not warrant expensive improvements of a permanent nature. Wing dams of loose boulders built out from the banks and between the islands serve to confine the water to one channel, narrow the channel, and scour out the bottom. In some sections dredging is necessary. Owing to the frequent changing in the position of the bars and the river channel itself, improvement is almost a hopeless task. The upper Mississippi and most of the Ohio have much more permanent channels than have the Missouri, the lower Mississippi, and other rivers. Slack water dams are much used along the Ohio. Permanent dams and locks are provided at some of the rapids as at Louisville, Keokuk, and Rock Island.

5. *Influence of the Type of Commodities Carried.*—On the lakes, iron ore, coal, lumber, grain, flour, salt, and stone are the dominant commodities carried and are offered in immense quantities. In addition to these there are miscellaneous and package freights. The Great Lakes vessels offer rates on many commodities so much lower than do the railroads that the lakes have almost a monopoly. In 1915 the vessels of the Great Lakes transported 47,500,000 tons of iron ore, 26,000,000 tons of coal, 300,000,000 bushels of grain, 460,000,000 feet of lumber, 15,000,000 barrels of flour, and 1,000,000 tons of miscellaneous and package freights. With such an immense tonnage and the concentration of traffic at a few ports special devices for the handling of these with dispatch and economy, as previously stated, are possible. At one of the Lake Superior ports 10,000 tons of iron ore have been loaded in 35 minutes. Grain and coal, each has special machinery to minimize the cost in money and time in trans-shipment. Lumber is still handled by hand, piece by piece, and there is little improvement in the handling of flour and package freight. Hand trucks and even electric trucks are used where possible and, as previously stated, the work is done by experienced, well paid freight-handlers.

Most of the tonnage on the inland rivers is miscellaneous freight (farm products, furniture, farming utensils, and such commodities) and package freight. No iron ore, and relatively little coal, except from the Pittsburg region, are shipped. Very little lumber is now transported in the form of rafts, either in the log or in rough boards and planks. Grain and flour go mostly by rail. The nature of the freight handled on the rivers will not allow the use of such mechanical devices as are found on the docks of the Great Lakes, nor are the freight handlers as efficient. The truck is rarely used. Through custom or necessity, or both, nearly all freight is carried by hand, one piece, whether weighing one pound or two hundred pounds, being the regulation load. It is not an uncommon sight to see a burly negro toting the handles to a plow, followed by another with the metal parts. One would not be surprised to see another make a 300-foot journey with the wrench were not that tool wired to the handles.

Passenger traffic (mainly tourists and excursionists) is large on both the lakes and the rivers. Passenger vessels on both types of waterways transport miscellaneous and package freights also. Such freight makes up, as previously stated, most of the commodity traffic on the inland rivers. Since the tonnage of bulk cargo commodities is so slight there is no demand for a special type of boat for such commerce. Freight is being carried on river boats that have been built primarily for passenger traffic and not at all adapted to the handling of freight. Many suggestions have been offered as to improvements in the carrying agents on the rivers, but little can be expected until bulk cargo commodities increase sufficiently to warrant the use of special types of freight boats, and there seems little prospect of any great increase in river traffic in the near future.

Decline in River Traffic and Reasons

In the last few years there has been a steady decline in the tonnage in spite of the active work of associations and commissions and the apparent need of increased transportation facilities in the country at large. The following data show the tonnage in 1901 and 1914 on the lower Mississippi:

Commodity	*Section of river*	*Tonnage in* 1901	1914
Grain	St. Louis to Cairo	137,954 tons	17,909 tons
Cotton	Vicksburg to New Orleans	71,925 tons	8,345 tons
Cotton seed, etc.	do.	60,936 tons	12,238 tons
Coal and coke	do.	1,225,970 tons	669,589 tons
Groceries and provisions	St. Louis to Cairo	83,656 tons	5,967 tons
Miscellaneous freight	Vicksburg to N. O.	137,557 tons	62,484 tons

Only in gravel and stone was there an increase in tonnage in the 13 years. A Memphis paper has recently announced (June, 1917) that the only packet between Memphis and New Orleans has suspended sailings, and the steamboat line operating up stream from Nashville is likely to lay up its boats because of lack of support of the shippers. There are many reasons for this decline, going on since about 1860, chief among which is the fact that the region tributary to the rivers of the Mississippi Basin do not produce the commodities that may be carried most economically by the waterways. Could the rivers have the commodities that go to make up the traffic of the lakes they would assume a rank of far greater importance in the transportation world. Moreover, the rivers do not occupy an advantageous position with respect to the great producing and consuming areas. The Great Lakes connect great wheat fields, iron mines, copper deposits, and pine forests with flour mills, blast furnaces, and steel mills and a large manufacturing and consuming public. The rivers run for the most part through a land of farms, with few commodities that can be carried easily and economically by water.

Characteristics of Lake Navigation

Lake navigation has many of the characteristics of that of the ocean. The large areal extent of the lakes makes them veritable "Inland Seas." Fogs, which frequently settle over them, in which ships must lie idly and wait or attempt to work their way perilously and slowly through, give one a touch of the experiences on the Newfoundland Banks. At times when the "glass" goes down and the wind drives the surface into huge waves that sweep over the decks of the vessels, keeping them awash, one experiences a bit of the stormy Atlantic. The tales of wintery ocean voyages are no more harrowing, no more exciting than those of voyages on the lakes in the late fall. Few acquainted with lake traffic in late years will soon forget the tragedy of the November storm of 1913, when more than a score of lake freighters with their crews were lost, some not leaving a single piece of wreckage or a body to indicate their resting place.

Although there are no passenger vessels on the lakes that can compare in size with the Mauretania or Olympic, there are many passenger liners that are as large and as luxurious as the average ocean vessel. Like the ocean liners, they carry both passengers and freight and maintain a schedule with the regularity of an express train. They rely upon regularity and service to attract traffic. Coasting vessels of small size that do a continual "drop-in" business with the small lake shore towns are fairly numerous

on the lower lakes where there are numerous towns and the population density is sufficient to warrant a fair amount of freight. Then there are the "tramp" steamers that carry commodities in cargo lots. Some of these "tramps" are operated by small companies that own but one or two ships. In some cases the tramp has a captain owner who serves also as a supercargo and drums up trade much as the New England skippers did in early days when the American flag flew on the "Seven Seas." In the last two or three decades, large corporations, most of which have grown from humble beginnings in lake shipping, have arisen. Lumber companies, grain dealers, mining companies, and railroads (now prohibited from engaging in lake traffic) also have invested large amounts of capital in fleets of lake vessels that are operated in connection with their business. The vast holdings of the Steel Trust in iron deposits in the Lake Superior region and its numerous furnaces on or near the south shores of the lakes enable it to utilize its fleet with great profit and to manage it on a scale the most business like and economical to be found in the world.

Lake commerce to-day shows modern America at work. It spells organization, activity, progress, more ships, bigger ships, larger cargoes, lower rates, and thus cheaper iron, coal, flour, and other commodities to the consumer.

Lake and River Navigation Contrasted

On the inland rivers all is different. One can never get away from the land. The cooling breezes that make a lake voyage a pleasure during the hot summers are not experienced. The scenery, the colors, the forms, the horizon, is dominantly a *land*scape. Nor does one experience much of the hustle and bustle that is characteristic of American life. A trip on the Mississippi River, however, is not without its pleasant experiences. It is a voyage in the romantic past. It carries one back to the 50's and 60's of the last century, for there have been few improvements or changes in the design of hull, in management or handling of freight in the last 50 years. The steamer winds its way leisurely around great bends, or across the channels to avoid bars, channels ever changing yet remaining the same in their deterrent effect on commerce. Here and there on terraces or bluffs are villages or towns whose life is inseparably linked with that of the river. The ramshackle buildings evince a departed prosperity. Other river cities, served by railroads, with smoking chimneys of busy factories bear every stamp of a busy industrial life. One passes wooded islands, broad flats, and lofty cliffs. Many of the scenic

features rival those of the Rhine. There are many sites and situations associated with Indian legends or heroic deeds of the pioneers. It is mostly of the past that we are told, of the days before the railroad, when the rivers were travelled by hundreds of boats carrying goods for the Indian trade, valuable furs and peltry, provisions for the trading posts, missions or forts, and products of the ranch and farms; of luxurious steamers crowded with immigrants, travelers, and men on business trips, and of exciting races.

That the rivers of the Mississippi Basin will ever become the great highways of commerce that they were in the 30's, 40's, 50's is a mooted question. Many men, captains and vessel owners, who have for years been associated with river traffic in all its phases, see little prospect for any great revival. They are not half so certain of the future as are the members of transportation boards of our river cities, secretaries of waterway commissions, and "pork barrel" congressmen. These men of experience, at least many of them, look upon the story of the river traffic as a completed chapter in the transportation history of America.

United States Expects to have 1,600 Merchant Ships, Aggregating 9,200,000 Tons, Near End of 1918

The United States has to-day 458 ships of over 1,500 dead-weight tons with an aggregate tonnage of 2,871,359, either engaged in or capable of participating in foreign trade. There are also 117 ships of a tonnage of 700,285 of German and Austrian origin. The United States Shipping Board Emergency Fleet Corporation has commandeered nearly 400 steel ships of more than 2,500,000 tons, which are being completed or under contract for construction in American yards. The Board's Fleet Corporation has also contracted for 636 ships with a tonnage of 3,124,700. Totaled these figures show that the United States will have near the end of 1918 a merchant fleet of more than 1,600 ships aggregating 9,200,000 tons to carry its foreign commerce, as compared with an overseas marine of 1,614,222 tons on June 30, 1914, scarcely a month before the European War began.

The tonnage referred to is exclusive of that engaged on inland waters, unsuitable coastwise ships and small craft operating along the coast and in bays and harbors, and does not, of course, include the prospective additional program of the Emergency Fleet Corporation.

THE NITRATE INDUSTRY OF CHILE

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CHILE is one of the few progressive and promising countries of South America. With Argentina we associate great agricultural production and possibilities, fields of wheat and corn and flax and droves of cattle and sheep, and from Brazil comes nearly three fourths of the world's supply of coffee and a third of its rubber. Chile, too, has an industry which forms the backbone of her national progress, the nitrate industry. The nitrates exported from Chile constitute about 60 per cent of the total value of all her exports, and the revenue derived from export duties on these shipments is from 70 to 80 per cent of the total annual government revenue.

The Four Sections of Chile

Chile is a long, narrow country stretching for about 2,500 miles along the Pacific from 18° south latitude to the extreme south end of South America. Its average width is only about 100 miles. For convenience it may be divided into four zones: (1) The desert zone which is a continuation of the desert coast of Peru, extends to about 27° south latitude; (2) the mountain belt from 27° to 33° contains copper and other valuable minerals; (3) the central or agricultural zone extending from 33° to 42° contains the best agricultural lands of Chile. The "vale of Chile" in this zone is similar in many ways to our Great Valley of California; (4) the island portion from 42° to the southern end corresponds to the western coast of Canada and Alaska.

The desert zone is usually referred to as the desert of Atacama. It lies on the western side of the Andes Mountains in a region where any winds from the east or southeast must pass over the mountains precipitating their moisture on the eastern slope and descending on the western side as drying winds. Flowing along the western shore of the region is a cold ocean current, and any winds which might blow from the Pacific over the land would tend to take up moisture rather than to precipitate it. Moreover, the region lies in the dry horse latitude belt. For these reasons northern Chile is one of the most absolute desert regions in the world; scarcely a plant grows there. A writer who visited there in 1912 says that parts of it had not had a drop of rain for 10 years; but other places have occasional light showers almost every year. Commonly such a region would be useless to man. This desert, however, is far from useless; on the other hand it is

the most valuable part of Chile, for in this desert are found the beds of nitrate of soda or Chile saltpeter.

The nitrate deposits are found on a plain between the coast hills and the Andes Mountains. In general they occur near the eastern base of the coast hills in a belt extending from about 19.5° to 26°, or about 450 miles. The width of this belt is usually less than 10 miles. The deposits are by no means continuous over this entire length. Some of the beds are within 10 miles of the Pacific coast and some are as much as 60 miles from it. The altitude of the deposits is from 2000 to 4000 feet above sea level. The nitrate of soda for which the deposits are worked finds a use in the manufacture of explosives and as a fertilizer.

Theories of Origin

Regarding the origin of the nitrate beds there is much difference of opinion among those who have studied the region and written on the subject. One theory is that the region was once the floor of an arm of the ocean, which was later entirely shut off from the sea by the rising of the land. Around the shores of this lagoon millions of birds deposited guano just as they are now doing along the coast of Peru. These accumulations of guano contained the nitrates which later were dissolved by streams and rain and carried into the lagoon, where the nitrates were concentrated as the water in the lagoon evaporated with the progressive aridity of the region.

Another theory is that the nitrates resulted from the decomposition of marine plants which accumulated in the basin. Perhaps both the guano and the marine plants played a part in the formation of the nitrates. Still other theories have been advanced in attempts to account for the origin of the deposits but they will not be considered here.

Whether or not the arid climate was responsible for the formation of the nitrates, it is certain that they exist there to-day because of the dryness of the region. Moderate rains would in a comparatively short time dissolve and carry them away.

The nitrate beds are really beds of rock which contain the nitrate. This rock is known as "Caliche" and from 10 to 60 per cent of its composition is nitrate of soda. The beds of caliche are commonly from 5 to 10 feet below the surface and are covered with a mantle of rock fragments, sand and salty deposits. In thickness the beds range from 1 to 6 feet.

The crude caliche is quarried or blasted from the earth in big chunks which are taken to plants where they are crushed

into small fragments in preparation for extracting the nitrate. There are about 100 of these nitrate plants or "oficinas" operating in northern Chile. In these plants the crushed caliche is boiled in water for about 20 hours. The liquid containing the soluble nitrates is then run into great pans and left there for several days. As the water cools the nitrate of soda crystallizes and collects on the bottom and sides of the pans; then the liquid is withdrawn and the crystals scooped out and dried for a few days, when they are placed in bags, weighed and stamped and are ready for shipment. The dry crystals contain about 98 per cent of pure nitrate of soda. A large modern plant will prepare about 200 tons of nitrate daily.

Since the nitrate industry is carried on in an absolute desert, all of the necessities of life and all of the equipment needed for the plants must be brought in from the outside, and water is generally piped from mountain streams 100 to 200 miles distant. Some water for the plants is obtained from wells sunk in the desert, but this is a comparatively small amount. Water was formerly brought by means of trains or pack animals from coast towns, whither it was carried in ships. Coal for running the plants formerly was imported from England and the United States, but recently crude oil has largely supplanted coal as a fuel; much of this is obtained from California. Some of the oil from Peru was used but it is so desirable for the production of gasoline that at present some oil is shipped from Peru to California where it is refined and the residue is returned for fuel for the nitrate industry. The nitrate centers are all reached by railroads from the coast. The ports from which most of it is exported are Antofagasta and Iquique. Antofagasta is the largest of the Chilean nitrate ports, with a population of about 60,000. Iquique is a town of about 50,000. Taltal and Tocopilla are minor shipping ports.

Chile has not always had a monopoly of the nitrate industry. Up to 1884 the most important beds were within the bounds of Peru and Bolivia. In 1879 a war was waged by Chile against Peru and Bolivia; at the termination of that war in 1884 victorious Chile obtained as a war indemnity, Tarapaca from Peru and Antofagasta from Bolivia, in which districts are found most of the nitrate beds.

Notable progress has been made in the industry since Chile obtained the nitrate fields. At the time of the war in 1880 about 226,000 tons of nitrate were exported annually. In 1890 more

than 1,000,000 tons were exported. The exports for 1912 reached 2,400,000 tons and in 1916 more than 3,000,000 tons.

Since 1850 more than 50,000,000 tons of nitrates, valued at $2,500,000,000, have been shipped from Chilean ports; 80 per cent of this has been utilized for fertilizing purposes. It is conservatively estimated that Chilean nitrates have contributed $4,000,000,000 in the way of increased agricultural production of the world.

For 30 years following 1880 the revenue collected by Chile as export duties on nitrates amounted to $300,000,000. At present the export duty is 55 cents per hundred pounds, which amounts to about $30,000,000 annually.

The nitrate industry is a capitalistic industry. A large plant fully equipped is estimated to cost about $1,400,000. A great deal of foreign capital is invested in the district. The following is a list of nationalities and the capital each has invested:

Chile	$55,000,000
England	50,000,000
Germany	20,000,000
Other Nationalities	25,000,000

There is but one American company operating in the region. The industry employs, in normal times, more than 50,000 men. The daily wages of these men range from $1.40 to $2.40. Most of them are natives of Chile, Peru and Bolivia.

Previous to the present European war most of the nitrate was shipped to Europe, and Germany was the greatest consumer. In 1912 about 80 per cent of all the nitrate exported from Chile went to Europe. When the war broke out many of the plants shut down, but later the United States began buying and at the present time is the greatest consumer of Chilean nitrate; the prices paid for it in 1915 ranged from $1.38 to $2.39 per hundred pounds.

Iodine is a by-product of the nitrate industry. It is obtained from the liquid in which the caliche has been boiled. In 1916 about 1,000,000 pounds of iodine were exported from Chile.

NOTE.—In the December (1917) *Geographical Review*, p. 486, Prof. Walter S. Tower has a discussion of a New Theory of the "Origin of the Chilean Nitrate Deposits." Briefly stated, this theory holds that "the deposits are the result of efflorescence from ground water, the minute nitrate content of the ground water being accumulated as a result of evaporation." This theory like all the others encounters opposition.—*Editor*.

PHYSIOGRAPHY AS A BASIS FOR COMMERCIAL GEOGRAPHY, BOTANY, AND HISTORY*

By Alison E. Aitchison
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AT a time when the tide of physiography in the high schools is receding, perhaps it may be beneficial to consider to what extent this branch of science servees as a basis for other studies. We are spending and have spent much time and energy and gray matter in trying to prove through endless magazine articles and speeches that first this, and then the other science, as taught in high school, is a pitiful failure. Is not any science either in high school, or university a failure if it does not help to develop in the student (1) some ability for clear logical thinking, (2) some interest in the subject pursued which shall follow him out into life, and (3) some realization of the adaptation of all things to their environment and of man's place and possibilities in the scheme of the universe? The present outlook indicates that if we do not spend some little time in trying to solve the problem of how our sciences, properly arranged, may be made to help one another in such a way as to save time and to make the science work of the high school years one strong coherent whole, we may find the whole science group discredited, while we sit around and discuss. The student may forget even before he reaches college most of the facts he has learned; many of us did, but that is not the criterion of success in high school science.

Let us take up the subject of commercial geography by sketching briefly a course in that subject which would be fitted to most ordinary high schools. First a discussion of the physical factors affecting production and transportation. These factors are primarily the location, the climate, the soil, the topography, and the mineral resources of a country. From these as a basis we go on to develop the great industries and commodities of commerce as they are influenced in their production and exchange by these physical and other non-physical factors. Thirdly we consider the great routes of trade as located and developed or retarded by these same physical factors. These factors determine what the agricultural products will be, the cost at which they will be produced and the extent to which agriculture will be the leading industry.

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* Paper read before Science Section of the Iowa Teacher's Association, 1917.

To show more specifically what is meant, take corn among the agricultural products. What climate and soil factors determine the location of the corn producing regions of the United States and the other corn countries of the world? To what extent and how does the topography of the country influence the routes and the cost of transportation the prices and the ultimate use of the crop? What other factors besides these physical ones determine the corn production and the purposes for which it is grown? Density of population, for example, is a question which can never be ignored. A question, pertinent at the present time, "Why is the United States government asking us to use corn in order that wheat may be sent to the allies? Why not send corn to the allies and use the wheat ourselves?" brings out very clearly the interrelation of climatic conditions, commerce and a nation's food habits. A little study shows that with the exception of Italy, the lower Danube basin, and extreme southern France, none of these countries have climates for the production of corn, and therefore the people are not used to depending on it as a food. Other factors of course enter into the problem, such as the bulkiness of corn and its keeping qualities, but this serves as an illustration. It is readily to be seen in the suggested study of corn that the background of physical geography is in constant use, in reference to topography, to soil and the elements which make it up. Take the one point of climate, we say the location of the corn belt is largely dependent on climate, but that is such a complex thing. There are so many possible phases of climate which may be the determining factors and unless the student has made some study of weather and climate at some previous time he has only a general idea of what is meant, and much time must be spent in developing the true notion.

Take again the first of the physical factors mentioned—location. In one of the well-known high school texts in physiography, one of the first subjects taken up is the origin of the continents and their location with regard to the greater and lesser oceans and the arrangement of highlands. These facts carried into the realm of commercial geography are pregnant with meaning. The mere location of the United States with regard to latitude is of supreme importance in deciding our fate as a producer of agricultural products. Of almost equal importance is the position of this continent with regard to the other continents, as the handicap of distance is one which can never be wholly overcome no matter what our means of transportation are.

For commercial geography, the case then seems clear, everywhere it rests on the basis of physiography a knowledge of which

lightens the work of both pupil and teacher and makes the course much more scientific and much more effective.

For the botany teacher it is equally desirable that the student have had a good course in physical geography. Especially is this true since the trend of high school botany is in the direction of the ecological phase of the subject for which a knowledge of land forms and the processes going on, on the land is so necessary. The very terms "the flora of flood plains, of young valleys, of hillsides, the relation of plant societies in the different horizons of a swamp," show that a knowledge of physiography is essential. How much better it would be if the student had this before attempting the botany work. A glance at the table of contents of a new text book in biology—not intended for high school, it is true—written by one of the leading biologists of the country for elementary college classes, shows very clearly the trend of the biological sciences at this time. A chapter headed "Aquatic Environment" contains the following suggestive sub-titles: Lakes and Ponds, Lakes Temporary Phenomena, The Great Lakes, The Finger Lakes, Flood-plain Lakes, Streams, Gradient of Stream-Bed, Ice in Stream-Currents, Silt. No comment on the physiographic basis of this is necessary.

In turning to history it seems almost unnecessary to point out specific illustrations, so clear is the evidence of the relation of these two studies. In discussing the physical geography of a country we are talking of the stage on which its history is played and the properties with which the players deal. We see the stage as it is set for the birth, the development and perhaps the downfall of a nation. We discover the agents which have painted the scenery and set the stage and if we are interested we may watch the players enter right and left, advance to the front, meet and greet each other.

Let your imagination wander for a moment in this way over North America. North America in the geological ages of the past is emerging from the ocean; hundreds and thousands of years are passing. North America acquires a soil, rivers carve great valleys and the surface becomes more and more rugged. The continent is supplied in the course of time with great forests from some of which fields of coal are formed. Percolating waters have brought together beds of iron, of lead, and of zinc; the sinking of the coast line has given a succession of harbors, while the erosion of rivers has helped to develop waterfalls. The Red man comes upon the stage; he does nothing to develop the natural resources of the country. We will let the curtain fall upon the first act.

The curtain rises. New players now appear. At an entrance far to the north, coming in by the way of the mighty St. Lawrence, enter the French actors while along the eastern coast the English players step into view. Both advance toward the center of the stage and the dramatic phases of the play are on. But what a contrast in the rate of advance. With almost incredible rapidity the French come up the great highway of the northern river and cut through the long stretches to the heart of the continent. How very, very long the English tarry in the narrow strip of country between the coast and the Appalachian mountains and with what great political and economic results that stay is fraught. Only a knowledge of the lakes of Canada, the great abundance of waterways, and the utter lack of highland barrier can completely explain the Canadian French advance, and how much better it is that that knowledge should not be the mere fact that these lakes exist, but an intelligent interest in the long series of geographical events to which their existence is due. A study of why the low Appalachians were for so long a complete barrier to the English, depends again on a knowledge of the topography and history of the Appalachian mountains, the origin and peculiarities of their passes. At every step the early history of the colonists was conditioned by geography. How immensely different were the rough boulder-strewn hills of New England from the low coastal plains of Virginia and the Carolinas. How different in their effect were the rapid, high gradient, non-navigable streams of New England and the sluggish rivers of tidewater Virginia. Every forward step from the Atlantic to the Pacific was modified in some way by the physical features of the continent.

May we not then arrive at this conclusion—that if physiography is taught in the high school by a teacher who has a knowledge of and a sympathy for the subjects which are to follow, in addition to his or her knowledge of and interest in physiography itself, that time will be saved, interest will be awakened and unity will be gained. If general science as a first year high school subject can so interest the pupil in physiography that it will again come to its proper place in the high school curriculum following perhaps that first year's work, then general science will have done physiography a good turn. But physiography itself must change its habits and cease to be a dry book subject, taught by any teacher who has spare time, and become a real vital thing which touches and conditions life at every point.

A NEGLECTED DUTY OF THE GEOGRAPHY TEACHER

By Hannah Lindahl
South Bend, Ind.

THIS is the age of practicality, the time when training for direct usefulness and servicce is emphasized, the days when one hears much of vocational education and guidance, and all are most commendable; but in our keen desire to be practical let us remember our supreme privilege and first duty,—that of instilling in the heart of the child a love for his brother, regardless of nationality, color, or creed, the world o'er.

Upon no other teacher of a subect in the school curriculum does the responsibility for securing this sincere respect for all mankind rest with such meaningful opportunity as upon the teacher of geography, for it is here that the child learns to know his brother and sister in the distant land, and largely upon the teacher's introduction and presentation of this stranger to the child in our school depends the tone of brotherly feeling that will sound forth from the hearts of these future citizens.

It is a stigma upon those of us who vauntingly boast of our Americanism as a type of civilization greatly superior to that found in any other nation or race. It is a rightful pride that spurs the American youth to greater service for his country so that he may truly eulogize it as the symbol of liberty, justice and truth; but a wrongful pride that is permeated with the spirit of bumptiousness which says to him of another nation or people of a different color, "Behold my superiority."

Need I call many witnesses to prove that this is no false accusation, no chimera? Am I constructing against the conceit of the American child, yea, even adult, a case without proof? Only look about you, the evidence is strong, and the verdict pronounced—guilty.

To our shores have come many of these stranger brothers, and again and again have we applied to them terms of disrespect. The average American child, who fails to realize that he, too, is not very far removed from some immigrants to this country, speaks of the Italian as the "Dago"; the emigrant from Poland, a "Polock"; the Chinaman, a "Chink"; the Jew, a "Sheeny," and we might enumerate others. These are too often applied in a contemptuous manner that seeks to brand the so-called with a stamp of inferiority.

The question arises,--how is the geography teacher of to-day exerting her influence upon this problem? Is she condoning this spirit of false Americanism; is she pusillanimously tolerating it; is she, in a negative manner, merely suppressing such utterances; or is she helping, in a positive way, by giving our boys and girls facts about the excellence of these people in certain lines of endeavor, facts on which the American youth may build a genuine appreciation of his fellow men? Are we, as teachers of geography, training our children to be Pharisaical, or are we uniting our efforts to eradicate this spirit? Are we merely talking the brotherhood of man, but by our daily words and actions proving that it is not a deep conviction within us?

It is just here that the truest and noblest work of the geography teacher is found. We all acknowledge the importance of emphasizing certain basic geographical facts in the teaching and mastery of this subject, but if the child leaves our class at the end of the semester or term with a fund of geographic principles and statistics but with no greater love for his brother, with no truer conception of what superiority means, the dominant purpose of the course has been defeated.

It is in geography that the opportunity presents itself to stress the contributions made to civilization by the various nations and races, and thus to establish proof that it is not position on any certain continent, nor utterance of any particular language, nor number of pigment cells in the skin that determine the greatness or superiority of individual, nation or race.

As it is that individual who has made the most of all opportunities who is named among the truly great, so is it with individuals collectively, the nation. If the geography teacher shows the child how much China has contributed along the lines of agriculture and civil service, what the world owes to Italy for her accomplishments in art and architecture, how the Jew has preserved much for us in religion and ethics, the American youth will come to an appreciation of these peoples and his heart will beat with the feeling of gratitude for their part in the onward march of civilization.

To give boundaries, to locate cities, to draw maps, to give geographically cause and effect, require the training of hand and head; but to feel akin with the whole world, to acknowledge one's debt of gratitude to other peoples, is the result of heart training, and not until this has been accomplished by the teacher of geography has she shown herself worthy of her high calling.

HONG KONG

HONG KONG is a granite island with an area of 29 square miles just off the coast of southern China and just south of the Tropic of Cancer. Out of a population of 300,000 people, two to three thousand are English, 2500 are Portuguese, and the remainder are Asiatics, mostly Chinese. Since the central part of the island rises to an elevation of 1800 feet, settlement is almost wholly confined to the coast. On the northern shore is located Victoria, the capital and the only important city, with a population of 166,000.

In 1841 the English acquired Hong Kong Island from China. The English regarded the possession of a port on this coast as a commercial and political necessity in order that they might retain a firm hold upon the trade of the East. In 1860 a small portion of the mainland was added, and in 1898 still more of the mainland and several islands were leased for 99 years. In 1841 there were only about 2000 fishermen, farmers, and pirates living on the island. Since then the English have developed the city into a healthful port, and the greatest entrepot of the far East.

The harbor of Victoria is especially well suited to the requirements of trade on a large scale. It has an anchorage of over 50 square miles, which could shelter one-half the ships of the world. It is protected even better than Gibraltar; it is usually guarded by a strong fleet of men of war and possesses immense concealed fortifications.

The harbor is really a section of the city of Victoria, because it is the home of 10,000 junkmen, cargo-shifters, ferrymen, and fishermen, with their families. In the day-time they shift about the harbor and along the coast and carry on their trade; at night they assemble their boats in their proper places along the shore where they anchor for the night.

Hundreds of steamers, junks, and sampans, or Chinese rowboats, ply back and forth from coast ports and interior river cities of the East and collect and distribute the vast quantities of merchandise which pass through the port of Hong Kong. Since the wharves are meagre and labor is cheap, the junks receive their cargoes directly from the ocean steamers. In ordinary times the harbor of Victoria contains from 50 to 75 ocean-going vessels; nearly half of these are British, about one-fifth German, and one-tenth Japanese.

Absolute free trade is the key note to Hong Kong's great importance as an entrepot. It is estimated that half a million boats of all kinds enter the port each year. In a normal year the s—

of the shipping that enters and clears amounts to about 21,000,000 tons. This is surpassed only by New York, Antwerp, Hamburg, and Rotterdam, and sometimes London.

Hong Kong is a great transfer point for ships much as Chicago is for railroads. Through this port England carries on an enormous trade with the far East. Practically all the ships sailing between the West and China have Hong Kong as a port of call. The merchandise is distributed directly to the Chinese cities or is stored in great sheds, called "go downs." Hong Kong itself has been termed a huge protected "go down." The island boasts of the largest docks in the Orient. It has almost a monopoly of the docking business because these docks can accommodate the largest steamers and men of war.

There are several reasons why Hong Kong is so important: (1) It has a large and excellent harbor; (2) it has absolute free trade, not even having a custom house; (3) commerce is protected by the English government; (4) it is situated in a central position for collecting from and distributing to the far East; (5) labor is cheap; (6) the English have made Hong Kong sanitary and safe for Europeans; (7) it has the largest docks in the East.

Quoting from Curtis, "Hong Kong is a monument to British enterprise; a realization of the British ideal of colonial government; an asylum for the oppressed; a hospitable home for wanderers of every race and nation, where freedom, toleration, and other virtues are exemplified in the highest degree; where people can come and go at will without answering questions; where there is no custom house and no regulations to interfere with the comfort and convenience of travelers." F. W.

The Expansion of Industry Already Achieved in England

The national production in Great Britain has increased 30 per cent over normal times, and with the assistance of 30 per cent less of the male population. Those very remarkable figures would have been impossible without the valuable help of women. The amount of work which is being done by women in industrial plants is enormous, and it has increased the efficient supply of munitions. Then, with regard to coal, the nation is producing within 10 per cent of its pre-war standard, though thousands of miners have gone into the army, and others are not working all the time they might. The pig-iron output, in spite of the depletion of labor, is normal, and mills are actually turning out 20 per cent more steel than before the war. All these are very encouraging figures from the point of view of the future development of the country.

THE REMARKABLE ISLAND OF JAVA*

JAVA is the most important, though not the largest, of the Dutch possessions in the East Indies. It is an island about the size of Cuba, and more than four times the size of the mother country, Holland.

Its people are almost entirely of the native Malay stock, the European population not exceeding 100,000 out of a total of more than 30,000,000. The Europeans, of course, control most of the business and industrial enterprises. The prosperity under European domination is shown by the great increase in population which has taken place during the past hundred years or more. For several generations their numbers have doubled every quarter of a century, without immigration. The density of the population now averages nearly 600 to the square mile. Some of the native princes still maintain their authority, subject to the Dutch governor-general, and retain their palaces, courts, and hosts of retainers.

Communication in the interior of Java is good, as there are about 1500 miles of railway, almost all of which is owned by the government. Batavia, a city of 140,000, situated near the western end, is the principal commercial center of the island.

The cultivation of sugar is a very old industry in Java, and has seen many vicissitudes. There are some 200 sugar plantations on the island, with an acreage planted in sugar in excess of 400,000. The sugar factories are equipped with the most up-to-date machinery. They produce for export about 1,660,000 tons.

Next to sugar perhaps the most important of Javan products is rubber. The plantation system is universally applied to rubber growing. The first rubber plantations were laid out about the year 1900, and the growth of the industry has been extraordinarily rapid. In 1914 there were over 400 rubber estates, with a total planted area of 154,000 acres. British capital has gone very extensively into this industry and some of the British companies have made enormous profits. At the beginning of the war the importation of rubber into Holland was prohibited. The market for this commodity was thus shifted from Europe, where it had always formerly been, to Java itself, and foreign buyers have flocked to the Javan centers where it was stored. The United States has become one of the largest consumers of Java rubber and is likely to remain so after the war.

Rice, which is to the Orientals what bread is to the Western nations, is the staple crop of the native Javans. Immense quan-

* Excerpted from *The Americas*, November, 1917.

tities are raised and consumed on the small farms. Curiously, however, the best grades are always exported and enter the world's markets, while to take their place a low grade of rice is imported from China, Burma, and the neighboring islands.

Coffee, of the well-known Java variety, is one of the oldest crops raised on the island. Coffee is often planted on rubber estates, between the rows of young rubber trees. In 1914 there were 140,000 acres planted with coffee alone. Tea is cultivated to some extent, on private plantations, and finds a market in Great Britain and Holland. Among the many other products of Java we may mention cinchona or Peruvian bark, which is used in making quinine. The plant was not introduced into the island until about 1854, but to-day Java is the world's chief source of quinine. The cocoanut palm is indigenous to the island, and the natives gather and bring in for sale quantities of cocoanuts. The dried meat of the cocoanut, copra, is exported to be used in making soap, candles, etc.

Java possesses very valuable forests, over which the government now exercises careful supervision. The most valuable are the teak forests, which cover over 275,000 acres. Among the mineral resources of Java are tin and petroleum.

The absence of any extensive manufacturing development causes Java to be a large importer of manufactured goods. It will surprise many to know that the island is the third largest importer of cotton goods in the world.

THE TIN PRODUCTION OF THE MALAY PENINSULA

THE Malay Peninsula lies at the southeastern corner of Asia and extends from 10° north latitude to the equator. The Dutch islands of Banka and Billiton are really an extended portion of the Malay Peninsula. The tin-bearing rocks of the peninsula continue into these two islands.

The tin of the Malay Peninsula has been mined since ancient times; in fact some very early Chinese records, dating from about 2000 B. C., state that tin was even then obtained from this region. These mines have long led the world in the production of tin. Up to very recent times it has been mined in a crude and wasteful manner. Thousands of tons of low grade "overburden" were cast away in the haste to reach the richer deposits. In large areas possible ore lands still lie unexplored and untested. Many places

which were passed by as useless in the past can now be worked at a profit. Real scientific development is just starting; of 17,000,-000 acres which may contain tin ore only 300,000 acres, or two per cent, have been set apart for mining.

In the first part of the nineteenth century deposits of tin were discovered on Banka Island; in 1820 1200 tons were mined there and by 1900 12,000 tons were produced. Since then the production has decreased. About the middle of the nineteenth century tin was found in Billiton; between 1850 and 1900 the out-put increased from 40 to 3000 tons a year.

The tin production of the Malay Peninsula is, however, by far the most important. Out of the world's tin supply of somewhat over 110,000 tons in 1915, British Malay produced 68,000 tons. Thus the Malay mines control the tin market of the world. The British control of the mines and the ever increasing demand for tin has caused a rapid growth in the mining industry. In the last 25 years the out-put has increased from 29,000 to 68,000 tons (1890-1915) or almost 150 per cent. To produce this 170,000 Chinese are continuously employed in the tin mines of the Federated Malay States. At the price of $630 per ton the tin production of the peninsula amounts to $43,000,000 and yields a duty of about $5,000,000.

Bolivia is the second largest tin producing country in the world, yielding over 25,000 tons annually. The famous old mines of Cornwall, England, are still yielding 6000 tons a year. Australia produces 5000 tons or more annually; South Africa and China each produce a few thousand tons. Tin is one of the very few metals which the United States does not mine in important quantities, our yearly output being only about 50 tons. F. W.

THE VALUE OF GEOGRAPHY

"From the standpoint of children's educational needs, or of international world-wide business relations, or of the ethical brotherhood of man, or from all of these and their connections, the fact must and will be recognized that the study of the world is the all-inclusive and all important aspect of Geography apart from the study of one's own locality. There is no other possible way than by the study of world Geography of cultivating wide observation, safe imagination, sound reasoning, and adequate sympathy." [*Report on Geography, New England Association of Superintendents,* 1901.]

PRODUCTION AND CONSUMPTION OF COAL

COAL is our commonest and most valuable and most wastefully used industrial resource. It is most valuable because it gives greater worth to all other resources, by enabling us to utilize them to our comfort. We can get along without gold and silver, but we don't waste them. We can't very well get along without coal, and we do waste it.

The Committee on Coal Conservation of the National Chamber of Commerce calls the attention of coal users once more to the fact that the demand is unprecedented. The mines are producing more coal than they ever before shipped, and the railways are hauling a larger number of cars than they handled in any previous year. Industrial activity of kinds to which coal is essential has reached a height we have never previously known.

All of this activity which relates directly to war will receive the coal which it needs. There is no room to doubt that. The Fuel Administrator declares he is determined that, for war purposes, public utilities, and domestic use, there will be available sufficient coal. The real question arises in connection with the requirements of industries which are not directly related to war.

In 1916 the United States broke all previous records, by producing and using 500,000,000 tons of bituminous coal. In the twelve months ending with December, 1917, it produced about 550,000,000 tons. The Fuel Administrator estimates that the present demand is at the rate of 600,000,000 tons a year. This estimate is based upon a demand from munitions plants that is greater by a third to a half than a year ago, an increase in the Government's requirements from two million to eight million tons a year, and demands of public utility plants that have risen by a third.

The difference of 50,000,000 tons between the estimated supply and demand will have to be made up by enlarging production, facilitating transportation and stopping the waste. The most patriotic thing to do, and probably the only thing which will avail much, seeing that the railroads have apparently about reached the limit of their capacity, is to stop the waste.

For the calendar year of 1915 the Geological Survey gathered data which indicates roughly the relative importance of the ways in which bituminous coal is used. The percentages of the total consumption in 1915 were as follows:

Industrial Steam Trade	33%
Railroad Fuel	28%
Domestic and Small Steam Trade	16%
Manufacture of Beehive Coke	9%
Manufacture of By-Product Coke	4%
Exports	4%
Steamship Bunkers at Tidewater	2%
Used at Mines for Steam and Heat	2%
Manufacture of Coal Gas	1%

Coal is produced in thirty states. The relative importance of these states was expressed by the Geological Survey in percentage of all coal produced (bituminous and anthracite) as follows for 1915:

Pennsylvania:			
Anthracite	16.8%	Utah	.6%
Bituminous	29.7%	Washington	.6%
West Virginia	14.5%	Montana	.5%
Illinois	11.1%	Texas	.4%
Ohio	4.2%	Arkansas	.3%
Kentucky	4.0%	Michigan	.2%
Indiana	3.2%	Iowa	1.4%
Alabama	2.8%	Kansas	1.3%
Colorado	1.6%	Wyoming	1.2%
Virginia	1.5%	Tennessee	1.2%
Maryland	.8%	North Dakota	.1%
Oklahoma	.8%	Georgia, Oregon, California, Idaho, Nevada, South Dakota	.1%
Missouri	.8%		
New Mexico	.7%		

The United States produces more coal than any other country. The latest statistics available with a degree of completeness are for 1914. In that year, in a world production in the neighborhood of 1,345,000,000 net tons, the United States contributed 38 per cent, Great Britain 22 per cent, and Germany 20 per cent.

In 1913, for which estimates are more complete, the production of all kinds of coal by the more important countries was approximately as follows:

	Net Tons		Net Tons
United States	569,000,000	France	45,000,000
Great Britain	321,000,000	Russia	35,000,000
Germany	305,000,000	Belgium	25,000,000
Austria-Hungary	59,000,000	Japan	23,000,000

[*The Nation's Business* for Jan. 1918.]

MINNEAPOLIS OUTLINE FOR TEACHING JAPAN AND CHINA

THE new course of study prepared by a selected committee of Minneapolis teachers and principals has been printed and is undergoing trial and criticism preparatory to revision and final adoption. It is a good piece of work and, in its final form, will doubtless be still further strengthened. The following outline covers a small part of the first term's work of the seventh grade:

JAPAN

The Japanese Islands have been called the British Isles of the Pacific. Why?

(Compare throughout with British Isles.)

I. Location and extent
   1. In path of trade between two continents
   2. Extent along Pacific coast
   3. Number of islands
   4. Compare in area with Minnesota

II. Surface and coast
   1. Character of surface
   2. Coast indentations and harbors
   3. Drainage systems and uses

III. Climate
   1. Great extremes
   2. Effects of heavy mid-summer rains

IV. Occupations
   1. Agriculture
      A. Method and stage of cultivation
      B. Extent of cultivated lands
      C. Products
         a. Variety
         b. Most valuable crop, amount of arable land in paddy fields; describe paddy fields
         c. Areas of tea culture
         d. Rank in silk production; state influence on this industry of monsoons, mountainous character of country, and dense population
   2. Fishing
      A. Extent of industry and reason
      B. Uses of product, lack of waste

3. Mining
    A. Kinds of minerals, value of copper
    B. Effects of lack of coal and iron
4. Forestry
    A. Extent of forest areas
    B. Necessity for cultivation and care
    C. Products
        a. Importance and care of bamboo
        b. Lacquer and its value
        c. Camphor tree culture (Note recent development in United States)
5. Manufacturing
    A. Great economic necessity; necessity for import of raw material and food
    B. Power development
    C. Abundance of cheap labor, results
    D. Products and their uses
6. Commerce
    A. Oriental means of transportation
    B. Development of modern methods

V. People and Government
1. Ability to support dense population
2. Characteristics: effect of powers of imitation and initiative
3. Reason for location of settlement
4. Government
5. Education, general and advanced

VI. Cities

Osaka, cotton and silk goods
Kioto, tea and art wares
Yokohama, seaport
Tokyo, capital
Nagoya, center of porcelain manufacture

VII. Colonies

Korea, food, timber, and minerals
Manchuria, great resources

VIII. Suggestive Questions and Problems:

Why are so few animals raised in Japan?

How did the size and location of Japan aid in her industrial revolution?

What economic problems were met by Japan with the taking over of Korea and with the gaining of concessions in Man-

Name some of the uses of paper in Japan.

The great point of difference between Japan and Britain is the production of coal and iron. How is Japan attempting to overcome this difference?

Why is Japan even more dependent upon manufacturing than Great Britain?

Why have we not succeeded in introducing silk and tea production into the United States?

Why is a crop failure more serious in a country where there is no large animal industry than where there is one?

Explain the sudden entrance of the soy bean into European commerce.

Why do Japanese celebrate the birthday of Commodore Perry?

IX. Drill

Locate and know something about:

Formosa	Honshu	Seoul
Yokohama	Kyoto	Fujiyama
Tokyo	Nagoya	Nagasaki
Osaka	Korea	

CHINA

China, a country of great natural resources and vast extent, has lacked means of communication with the outside world. State the results.

I. Compare China's position, and area with the United States.
   1. Note the water boundaries
   2. Communication with advanced nations
   3. Extent and position of territory

II. Surface, coast, and climate
   1. Contrast with United States
      A. As to location and trend of mountain areas
      B. Distribution and character of drainage basins
      C. Variety in climate
      D. Influence on products of prevailing winds
      E. Coast as affecting climate and trade
   2. Location and extent of desert areas, mountain ranges, alluvial plains, loess deposits, arid and semi-arid plains

III. People and government
   1. Characteristics of people; reason for
      A. Willingness to work
      B. Skill in spite of scarcity of opportunity
   2. Condition of government

IV. Industries and products
1. Agriculture
A. Industries peculiar to China; effects of summer rain and dense population on industry
a. Tea production, vast amount of labor
b. Rice cultivation, its commercial and food value
c. Silk culture
B. Peas and beans and their place in China's diet
C. Grains, other than rice
2. Forestry, great range and variety, from bamboo to spruce
3. Mining
A. Enormous possibilities
B. Standing in coal and iron production
C. Compare with United States in output
4. Animal industry
5. Fishing: Chinese fish culture, the best in the world
6. Commerce
A. Means and methods of transportation
B. Significance of caravan trade
C. Importance of Grand Canal
D. Reasons for extent of cart and wheelbarrow transport

V. Cities
Peking, capital and ancient city
Shanghai, world's greatest silk market
Hankau, tea market
Tientsin, treaty port at north terminus of Grand Canal
Canton, seaport of southern China

VI. Suggestive Questions and Problems:

State the connection between the summer rains and dense population of China.

What conditions have made Shanghai the greatest silk market of the world?

Why did an industrial revolution affect Japan sooner than China?

Why are the Chinese the best of laborers?

Chinese boats and carts use wind power where possible. Why?

Describe an irrigated paddy field.

What industrial changes may we look for in China in the near future?

Compare the southeastern and the northwestern parts of China in relation to density of population and development of natural resources. Explain.

What does the Great Wall of China tell us of China's ancient civilization?

What have western nations learned from China?

VII. Drill

Locate and know something about:

Peking	East China Sea
Great Wall	Hoang-ho
Shanghai	Yangtse-kiang
Canton	Tientsin
Grand Canal	Hong-kong
Lassa	Altai
Tibet	Gobi
South China Sea	Mongolia

MINIMUM ESSENTIALS IN PLACE GEOGRAPHY, 1ST TERM, 7TH GRADE

Be able to locate:

1. All the countries of Europe, the provinces of Canada, India, Australia, South Africa, Egypt, Chinese Empire, Guiana, Siberia, Belgian Kongo, Sahara.

2. Coast waters: Atlantic, Pacific, Indian and Arctic Oceans; Mediterranean, Red, Black, Baltic, North, Irish, White, Adriatic, Aegean, Marmora, South China, East China, Japan, Arabian, and Bering Seas; Bay of Biscay, English Channel, Gulf of Guinea, Bay of Bengal, Gulf of St. Lawrence, Bay of Fundy, Hudson Bay.

3. Straits: Dover, Gibraltar, Skagerrack, Kattegat, Dardanelles, Bosporus, Malakka, Bering.

4. Rivers: Thames, Mersey, Clyde, Seine, Rhone, Rhine, Elbe, Po, Tiber, Danube, Volga, Lena, Yenisei, Indus, Ganges, Brahmaputra, Yangtse, Hoang-ho, Amur, Ob, Murray, Darling, Nile, Kongo, Niger, Zambezi, St. Lawrence, Fraser, Mackenzie, Nelson.

5. Lakes: Geneva, Dead Sea, Baikal, Caspian, Aral, Tanganyika, Nyassa, Wener, Superior, Huron, Erie, Ontario, Winnipeg, Great Bear, Great Slave.

6. Canals: Suez, Manchester, Kiel, Sault Ste. Marie, Welland, Grand.

7. Mountains: Cheviot, Pyrenees, Alps, Apennines, Carpathians, Caucasus, Kiolin, Valdai Hills, Ardennes, Ural, Himalayas, Altai, Atlas, Australian Alps, Rocky.

8. Peaks: Blanc, Matterhorn, Jungfrau, Elburz, Everest, Fujiyama.

9. Islands: British, Malta, Sardinia, Sicily, Crete, Cyprus, Jersey, Isle of Man, Greenland, Iceland, Newfoundland, Prince Edward, Jamaica, Trinidad, Bermudas, Bahamas, Barbados, Azores, Madeira, Canary, St. Helena, Madagascar, Borneo, Java, Sumatra, New Guinea, New Zealand, Ceylon, Tasmania, Formosa, Honshu, Vancouver, Samoa.

10. Cities: locate and give an important fact:

London	Hamburg	Athens
Berlin	Rotterdam	Bombay
Paris	Glasgow	Sheffield
Vienna	Marseilles	Cardiff
Rome	Madrid	Ottawa
Petrograd	Copenhagen	Port Arthur
Constantinople	Hong-Kong	Karachi
Peking	Johannesburg	Colombo
Liverpool	The Hague	Kimberley
Naples	Trieste	Port Said
Montreal	Halifax	Vladivostok
Dublin	Warsaw	Ghent
Lisbon	Dresden	Prague
Venice	Manchester	Bergen
Moscow	Auckland	Goteborg
Alexandria	Winnipeg	Baku
Canton	Vancouver	Bucharest
Quebec	Tientsin	Amsterdam
Singapore	Delhi	Odessa
Cape Town	Zurich	Hankow
Birmingham	Oporto	Sydney
Munich	Osaka	Stockholm
Milan	Yokohama	Belfast
Lyon	Madras	Brussels
Bordeaux	Havre	Barcelona
Edinburgh	Christiania	Melbourne
Southampton	Cairo	Toronto
Tokyo	Shanghai	Irkutsk
Calcutta	Budapest	Batavia
Antwerp	Geneva	

THE CANAL IN OPERATION*

THE slides and other adversities encountered in the construction of the Panama Canal have apparently been overcome, and so the problems of the Canal shift from construction to operation. It must be maintained and defended, and it must handle

*From an article by Seymour Paul in *The South American*, Nov. 1917.

ships quickly and safely. And the ships that come here must enjoy every facility to assist their coming and going. That is why there is a coaling plant at Cristobal capable of giving ships coal just as fast as they can take it, why there is a dry dock a thousand feet long, the largest in the Western Hemisphere, at Balboa, with shops and cranes and all necessary adjuncts for repairs; that is why large fuel-oil plants as well as coal plants are situated at both ends; why there are thousands of feet of new wharfing space, and why the supply system is ready to furnish foodstuffs, meat and clothing, ice and cold storage, ships' gear and what-not—all to expedite traffic.

What of the traffic? In January, 1917, the Canal had its biggest month. One hundred and seventy-five ships made the transit, not including the ships in Government service at the Isthmus. Their aggregate net tonnage, according to the rules of measurement for the Canal, was over 561,000. They carried over 671,000 tons of cargo. The total length of all these ships was 61,189 feet. Placed stem to stern, they would have formed a solid line 11.6 miles in length.

From the time the Canal opened, on August 15, 1914, to the first of April of 1917, 3,249 ocean-going ships passed through it. Their aggregate net tonnage was 10,718,683, and the cargo they carried amounted to 13,453,386 tons. Suppose we reduce it to terms of railway traffic. In the year ending June 30, 1914, the total freight handled on all the railroads in the United States was 1,654,842,539 tons. During the fiscal year ending June 30, 1915, the cargo carried through the Canal amounted to 4,969,000 tons. The railroads handled in the year about 333 times what the Canal handled.

The railroads had 2,356,338 freight cars; they had an aggregate capacity of 94,253,520 tons, an average of 40 tons per car. The 4,969,000 tons of cargo going through the Canal would have filled 124,225 cars, one-nineteenth of all the freight cars in the country. The 124,225 cars, with their train-length taken at 42 feet, would form a solid train 998 miles in length. It would parallel the Canal over 19 times. It would reach nearly half way from Cristobal to New York. It lacks 94 miles of being long enough to fill a main line track from New York to Jacksonville, via Philadelphia, Washington, Richmond and Raleigh. It is longer than from Chicago to New Orleans by 58 miles, and would stretch ten times between New York and Philadelphia and leave 78 miles over.

The biggest single item of freight is nitrate from the fields of Chile. Up to the beginning of 1917 nitrate shipments through

the Canal had aggregated 2,691,532 tons—about one-fifth of all the cargo going through the Canal. This traffic has been going strong since the beginning of the war, which is to say throughout the time the Canal has been open; and of late it has been going stronger, as during the last half of 1916 the nitrates amounted to 1,145,445 tons. The war has stimulated this trade, and the traffic would have been even greater but for a relative scarcity of ships.

Coal has been the next item, aggregating 831,266 tons in the same time. The greater part of it has been shipped from Norfolk, Newport News, Baltimore, and New York to the west coast of South America, although a good deal of it has been handled westward in the United States coastwise trade, and British coal, principally for the Admiralty, has made up a considerable part of the trade.

Refined petroleum, next in order, with 624,325 tons, has been shipped principally from Atlantic and Gulf ports of the United States to the Far East, China and Japan having been the principal consumers.

Sugar, 578,388 tons, has been more extensively distributed than any of the foregoing. Nearly 40 per cent has been in the United States coastwise trade, mostly westbound; over 30 per cent has been raw sugar from the Far East to the United States; About 30 per cent has been from the west coast of South and Central America, divided about evenly in destination between the United States and Europe.

Other important articles are manufactured goods of iron and steel, lumber, barley, wheat, crude oil, iron ore, canned goods, coke, copper, railroad materials, raw cotton, machinery, miscellaneous manufactured goods, copper ore, flour, cacao, naptha, coffee, chrome ore, tin, wool, cement, and an infinite variety of lesser goods.

The traffic of the Canal has moved in very large part between well-defined trade areas. Summing up the movements both ways over the routes between these areas, the proportion may be indicated as follows: Between the United States and the west coast of South and Central America, 22.63 per cent; United States coastwise trade, 19.88 per cent; between the United States and the Far East, including Oceania, 16.43 per cent; between Europe and the west coast of Central and South America, 10.64 per cent; between Europe and the west coast of North America, 9.48; between the Atlantic terminus of the Canal and the west coast of South and Central America, 6.99 per cent; between Europe and the Far East, including Oceania, direct, 1.94 per cent.

CURRENT MATERIAL FOR THE GEOGRAPHY TEACHER

National Debts of the World

ABOUT three-fourths of the great total of 45 billion dollars of national indebtedness in 1913 was owed by European countries, the remainder being distributed among the other grand divisions.The 1913 debts of the European countries were in round terms $32,000,000,000, Asia $4,000,000,000, South America $2,300,-000,000, North America $2,100,000,000, Africa $1,500,000,000, and Oceania $2,000,000,000. It is not possible to determine with accuracy the increase of the debts of the various grand divisions during the half century, in which the national debts doubled. Of the world's national debts in 1874, which aggregated at that time about 22½ billion dollars, about 15 billions were owed by European countries, and the remainder distributed among the other grand divisions, that of North America alone being about 3 billion dollars, the debt of the United States being at that time at approximately its high water mark following the Civil War.

Two-thirds of the great national debts of the world at the beginning of 1914 was owed by the countries which before the end of that year had entered upon a war which would double and treble, and perhaps quadruple, the enormous national debt then existing. Of the 45 billion dollars of national debts in existence at the beginning of the year 1914 no less than 34 billion dollars were owed by the countries which have since entered the war. France stood at the head of the list with an indebtedness of $6,346,000,000, Germany (including the German states) $5,027,000,000, Russia $4,-536,000,000, Austria-Hungary $3,869,000,000, United Kingdom $3,-486,000,000, Italy $2,921,000,000, Australia $1,433,000,000, Japan $1,241,000,000, United States $1,028,000,000, Portugal $948,000,000, Belgium $826,000,000, Turkey $624,000,000, Canada $483,000,000, New Zealand $438,000,000, Rumania $316,000,000 and Bulgaria $135,000,000. This list of countries whose total debts at the beginning of the present war were $33,657,000,000 includes only those which have actively participated in the fighting. In addition to this there are a half dozen countries—China, Siam, Brazil, Greece, Panama and Cuba—which have declared war but have not yet sent troops to enter upon its activities, and their debts at the beginning of the war, if included in the above aggregate, would show that the nations participating actively or prospectively in the present war had already, before this war began, a total of 36 billion dollars of national debts out of a world total of 45 billion dollars. To put it in a single sentence, the world's national

debts at the beginning of the present war aggregated 45 billion dollars, and of that enormous total three-fourths were owed by the nations thus entering upon a new war, which has now more than doubled, and will probably treble their large indebtedness of 36 billions which existed at the beginning of the war.

[O. P. Austin in *The Americas* for Nov. 1917.]

The People and Government of Afghanistan

The people, products of this unkindly soil, are hardy (the weaklings die,) stubborn, brave, and so treacherous that the word gains an intensive meaning when applied to them. Towards strangers they are servile or hectoring, the probable result in personal financial profit being the sole rule of conduct. Luxury, even comfort, to them is often what we call vice. Ingenious in sensuality, they are intriguers by instinct, while running through their whole character there is a wonderful arrogance, vindictiveness and cruelty. Born and bred amidst an unceasing struggle with nature for the means of life, they live hard and they die hard. In spite of the rigid, stern and narrow ceremonialism of their Mohammedan religion, Afghans are not fanatical; most creeds are tolerated, the chief exception being Christianity. Hatred of Christians springs less from questions of dogma and faith than because the blood of ancestors and tribesmen cries for vengeance; and because of the supposed determination of the British Christians to enslave the Afghan people and force them to "carry loads." Unlike the grasp of an Amir, which now and again seizes upon an individual while the crowd escapes, British rule is feared as a wrought-iron system regulated by an inexorable screw called "law," which squeezes free hill-men into the pulp of which slaves are made. The government of the country is an extreme Eastern Absolutism wherever or whenever the different tribes are cowed. Regular authority is based upon the dumb terror inspired by hideous and dramatic punishments. Tribute is oftentimes collected by armed forces after much bloodshed. An Amir of Afghanistan must be merciless, and his people must believe him to be the implacable enemy, secret or declared, of the government of India. [Mill's International Geography.]

War Attitude of Latin America

Of the six republics of Central America, one (Panama) has declared war against Germany, and four others have severed relations with that country. Of the three republics in the West Indies, one (Cuba) has declared war, and one (Haiti) has severed relations with Germany. Of the 10 South American repub-

lics, one (Brazil) has declared war, four (Peru, Bolivia, Uruguay, Ecuador) have severed relations with Germany, one (Chile) has revoked her neutrality, and two (Argentina and Paraguay) have taken an open but unofficial stand in favor of the Allies. Mexico, Colombia, and Venezuela have taken no action and are officially neutral. None of the three is at present warmly friendly to the United States.

A COMMUNICATION

The Question of the Bounds of Geography

Editor of The Journal of Geography:—

If you will permit me I would like to discuss briefly through the pages of the Journal certain parts of your interesting paper which was printed in the December number, believing that through discussion progress results.

For myself as a teacher and student of geography I cannot admit the validity of the latter half of the following sentence appearing upon the first page of the article referred to: "There is no doubt about the kind of material that occupies the middle of the field of geography, but no man living would attempt to say where the outer limits of this field lie."

That there has been no agreement among geographers or teachers as to the limits or bounds of geography I am sure we will all be ready to admit, but that this haziness is necessary, or that it is inherent in the nature of the subject is a very different matter. If there is any unity in geography or any basic idea underlying the conception; if it is a real science, as I believe it to be, its bounds should be as clear as those of chemistry or biology. If geography is to continue to claim an important place in our schools we should be able to distinguish it from other subjects. Because almost every maker of school programs as well as almost every geography teacher has confused geography with the different sciences, with nature study, and with information about various industrial processes, is far from signifying that there is not a definiteness in the concept.

Very illuminating thoughts along this line, which I venture to say have been read by very few, are to be found in an article by Prof. W. M. Davis in the *Scientific American Supplement* for January, 1904.

My own practice has been for some years to define geography in much the same manner as Prof. Davis, although I would, perhaps, go a little farther than he does in limiting the field and making it more clearly defined.

According to this view the compiling of lists of "minimum essentials in place geography," to quote an expression from your article above referred to, should have no place in school geography. This sort of work, like the details of industrial processes, is not true geography. If we wish to continue to make geography a catch-all for all sorts of information which we do not know where else to place, then it would be all right to encumber geography with such things. But until we recognize that geography is the study of relations instead of the acquirement of mere facts it will never hold the honorable place which it should in our schools.

In the short space of this criticism I cannot go into an exposition of my reasons for believing that geography has a definite content and definite boundaries. A department of geography under my direction has recently been added to the *Western Journal of Education* and here I hope to work out my particular point of view.

H. W. Fairbanks,
Supervisor Geography, Berkeley Schools, Cal.

NEW YEAR RESOLUTIONS FOR THE GEOGRAPHY TEACHER

1. Since most of the world is engaged in a great war to prevent wars, I will remind myself continually that, as a geography teacher, I have much to do in furthering the cause for which men are giving their lives: therefore, I will teach very earnestly the larger geographic truth that humanity, with its common needs and common interests, is really at one, and that the good of all is the good of each.

2. I will remember that geography is a human study—it deals with real people who have a real setting.

3. I will strive to know as broadly as possible each people about whom I teach, so that I may be fair and honest in my representations concerning them.

4. I will do everything in my power, first, to develop the imagination of my pupils; second, to help them gain power to trace causal relationships from geographic facts.

5. I will select with unusual care the geographic facts to be taught, remembering that "facts are stupid things until they are brought into connection with some general law."

6. To enlarge my own geographic field, I will make at least one new regional study a semester, that is, I will select one region about which I will center my reading for that time.

7. I will review constantly my own place geography, and will add a few names every week to my "definite location group."

Rose B. Clark, Peru, Neb.

RECENT PUBLICATIONS

TOPOGRAPHY AND STRATEGY IN THE WAR.. By Douglas W. Johnson. Henry Holt and Company, New York, 1917, pp. x+211. 18 diagrams and maps, and numerous illustrations. $1.75 net.

The author states in his preface that "he was particularly anxious to discover how far military operations are still affected by the element of terrain" and he concludes that there is "ample indication that the role played by land forms in plans of campaign and movements of armies is no less important today that in the past."

He makes it clear that the four escarpments with their steep faces toward Germany and their gentle slopes toward the Paris Basin have enabled the French to effectively block the German advance at all points south of Verdun. He makes it equally clear why the Germans chose the easy path across the plains of northern France for making their first impetuous drive to reach Paris. The failures of the repeated attacks upon Verdun are interpreted in the light of the configuration of the land surrounding the great French fortress. The intricate network of canals and drainage ditches in northern Flanders, and the water-soaked land, baffled the Germans in the attempted drive upon Calais and have made all fighting in this region extremely laborious.

Broad rivers with swampy banks, lakes and marshes, and mud have played a constant part in all operations on the eastern front. The Carpathian Mountains with their few passes, narrow defiles and many ranges prevented the Russians from clinching their victory over the Austrians in the early part of the war. When one realizes that practically every topographical advantage on the Austro-Italian boundary lies with the Austrians, he wonders that the Italians achieved as much as they did. The last four chapters deal with the various campaigns in the Balkans.

The book is an exccellent piece of work. Rarely if ever does the author stretch a point to give any undue support to his main thesis. By means of maps showing the topography of the regions which are under consideration, he shows point by point how the topography influenced and often decided military movements. It is true that the book largely ignores elements in the strategy of the war which do not arise from topography; but the book does not purport to do otherwise. The thoughtful reader understands this. The book will stand as one of the permanently valuable contributions to the history of the war. R. H. W.

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AGRICULTURE ON THE NILE DELTA

By V. C. Finch
University of Wisconsin, Madison

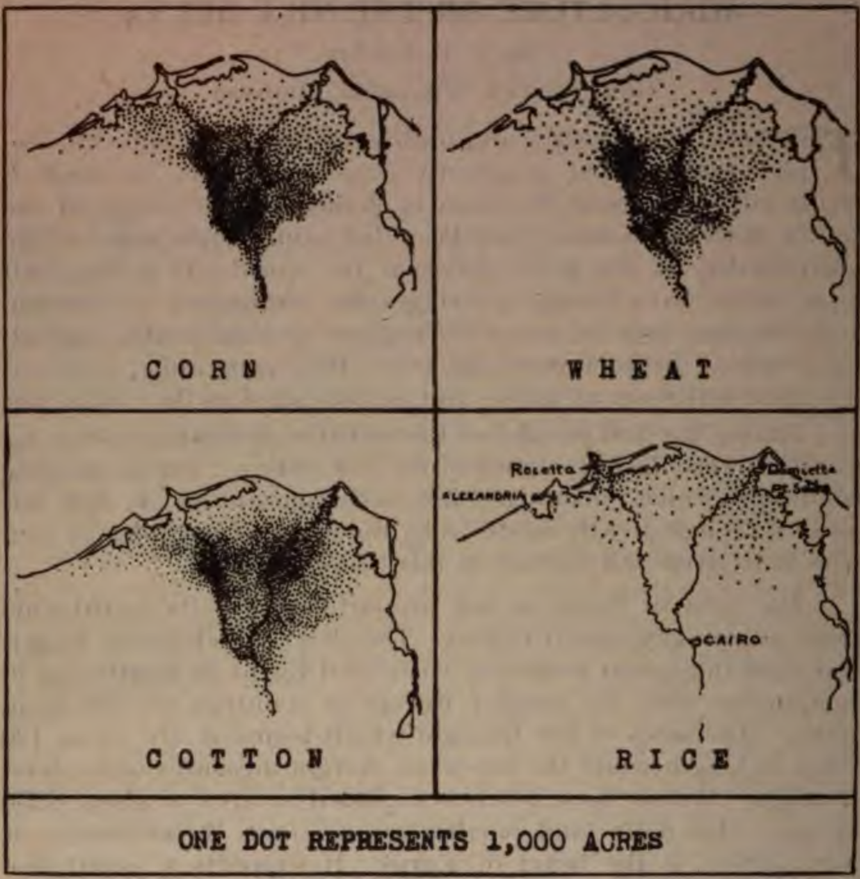
THE location, structure and outline of deltas are subjects emphasized in most geography classes. Indeed, so much is frequently said about the form of deltas and the origin of the rather descriptive name they bear that pupils loose sight of the individuality of the great deltas of the world. It is true that most deltas have certain physiographic characters in common and also that they are generally regions of considerable agricultural value. In the human aspects of their geography, however, the great deltas are as unlike and as individual as the continents.

Among the first peoples of the world to develop a settled agriculture were the inhabitants of the Nile valley. The geographic conditions which encouraged this early agriculture are still important though greatly modified by the many generations of men who have lived and worked in this historic region.

The area of Egypt is not proportionate to its world-wide fame as an agricultural region. The delta, which is the largest and most important section of cultivated Egypt, is small even in comparison with the smaller European countries or American states. The sides of the triangle which bound it are about 120 miles in length while the sea-ward margin measures only about 70 miles. Within these limits is included an area of about 6,250 sq. mi. This delta land, smaller in area than Massachusetts or New Jersey, is the heart of Egypt. It supports a population about the size of that of Pennsylvania, mainly by agriculture. This gives to good land the very high average value of $700.00 to $800.00 per acre. The farms are therefore small, usually less than five acres.

Situated as it is on the borders of a great desert no part of the Nile delta has sufficient rainfall to support agriculture. Even on the Mediterranean coast the precipitation averages little more than five inches annually, while Cairo, at the delta head, receives an average of only one inch of rain. The intensive agriculture of the region is possible only with abundant irrigation. For many centuries the waters of the river have been led out in a network of channels over the gently sloping surfaces created by the aggradational work of the two great distributaries, the Rosetta

and the Damietta channels. These, branching fork-like, divide the delta into three unequal parts; the outermost limits of the area being determined by irrigation canals which alone serve to set off the fertile lands from the desert beyond.



Modern engineering has worked many changes in the methods by which the Nile waters are spread over the fields of the cultivator. Under the old system the principal irrigation was accomplished by the natural summer flood of the river. The land was divided by earthen embankments into flat-bottomed basins. Into these poured the flood waters with their load of silt. The water was allowed to stand until the soil was fully soaked and the load of silt deposited and the excess then turned off into the drainage canals. Since the height of the flood is not always the same it was sometimes difficult to flood the higher basins near the river, while at other times the waters could not be controlled. A serious drawback to this method also lay in the fact

that the water occupied the land for a considerable part of the summer and extensive culivation of summer crops was rendered impossible.

The improvements of the last century have enabled the delta farmers to turn from this practice to perennial irrigation by means of which the fields can be watered at will without being wholly flooded. This is made possible by the storage of flood water further up the river behind the great dam at Assuan to be doled out in the winter period of scarcity; also by the construction of barrages. These are light wing-dams built at Cairo and at other places in the delta channels. When their sluices are closed they have the effect of piling the water of the river up temporarily during which time it may be turned into the irrigation canals without being pumped over the embankments. This process has the disadvantage of conveying less of the fertilizing silt to the land, a matter of importance in this wood-less land where all animal manures must be dried for fuel. This method of irrigation also imposes the additional necessity for a carefully worked out drainage system by means of which the soil is kept properly aerated.

The various crops which characterize Egyptian agriculture are in some measure responses to conditions of climate and soil, though irrigation has done much to render them less directly dependent upon their geographic environment. The crops which are the chief dependence of the people are four: wheat, corn, clover and cotton. The first two are for the food of the people, the third is the principal feed of the work animals in a land where there is little room for pasture. Cotton is the money crop. Other crops of minor importance are barley, sugar cane, legumes, millet and rice.

The agricultural year of Egypt is divided into three seasons, (1) *Saifi* (Summer, March to October) in which the corn, cotton, sugar-cane and rice are grown, (2) *Nili* or *Nil*, from the end of July to the end of October, is included in Saifi. It is the period of the rising Nile and is the particular time devoted to corn cultivation everywhere on the delta except on the salt lands of the northern margin where rice is important. (3) *Chitwi* (Winter, November to May) was formerly the principal agricultural season. It is during these months that the wheat, barley, beans and clover (berseem) are grown.

Egyptian cotton is valuable because of its long staple and receives a great deal of attention because of the cash income derived from it. It occupies, next to corn, the largest area in the delta. The planting begins in February and lasts until early

April. The land is watered once before plowing and again when the seed is sown. Thereafter it is watered at intervals of from fifteen to forty days. The fields are picked over two or three times between late August and early November. Following the removal of the cotton, clover is usually sown as a winter crop, also under irrigation. About half of the delta land is thus made to produce two crops per year. Where the land is in production the entire year the water supplied to it would total 70 inches.

Wheat and barley have grown in Egypt since earliest times, and it is to these grains that reference is made in the history of Joseph's sojourn in that country. The grains are of poor quality and have little market value. Corn, though a comparatively recent introduction, ranks first as a food of the people. The amount of rice grown depends upon the apparent abundance of water as estimated by the authorities. In 1914 it was altogether forbidden to grow it.

In this region of dense population the farmers, or *fellaheen*, do not live in scattered farm houses as do American farmers but in little crowded, mud-walled villages scattered thickly over the land. Though most unattractive from our point of view this custom has, to the Egyptian, the double advantage of being more economical of the valuable land and of affording protection against marauders.

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OREGON GEOGRAPHY TEACHERS ORGANIZE

AT THE annual meeting of the Oregon Teachers' Association in December, the geography teachers formed an Oregon branch of the National Council of Geography Teachers. Prof. L. P. Gilmore of the Monmouth Normal School was elected president and Miss Ida M. Smith of Eugene was elected secretary-treasurer. Prof. Warren D. Smith of the State University is state director. County organizations are being formed, Lane County having already begun holding monthly meetings. Dirctor Smith writes: "I think we can see sunlight ahead in the geography situation in Oregon."

RUSSIA IN WAR TIME

By Horace V. Winchell
Minneapolis, Minn.

The excellent article of which the following is an abridgment was published in the Mining and Scientific Press, *San Francisco, October 27, 1917, and came in our hands through the courtesy of Prof. A. N. Winchell of the University of Wisconsin. Representing, as the article does, the first hand observations and impressions of a highly competent observer and trained scientist, we feel that readers of the* Journal *will welcome it since its original publication was in a periodical which few geography teachers are likely to see.* Editor.

THE total area of the Russian Empire is 8,600,000 square miles. Its population is estimated at 181,000,000. The total area of Europe is 3,800,000 square miles and the population about 450,000,000. The climate of Russia is continental and the variation between the summer and winter temperatures is great. The mean January temperature at Moscow is 54° lower than that of July. Central Germany has a temperature-range of 34°. The snow lies for many months over a large portion of the vast Muscovite territory. The annual rainfall in northern and central Russia is moderate, being from 20 to 24 in., but quite sufficient for crops, being distributed throughout the year. As one goes south the rainfall decreases rapidly, averaging from 8 to 12 in., and in the extreme south there is very little precipitation in the fall and winter, so that the period of vegetation is too short to permit the growth of trees. Thus we find the forests of northern Russia contrasted with the steppes of southern Russia, and this contrast makes itself felt in every department of economic and national life. The forest district begins at the Arctic circle, where the trees are coniferous, consisting largely of spruce, fir, pine, and birch, and extends southward to the latitude of Moscow and the upper waters of the Volga. The mixed forest region covers central and western Russia as far south as the Black Sea. In the Caucasus I saw the finest forests of white oak, white ash, Persian walnut, and beach, together with beautiful fir and hemlock.

The population of the coniferous belt varies from 1½ to 36 per square mile. In Finland, which is somewhat warmer, the population is 21 per square mile, but agriculture and stock raising are comparatively unimportant. The population of the mixed forest region is from 50 to 130 per square mile, exclusive of Moscow. The population of the Baltic region is from 60 to 80 per square mile, while Poland, which is extremely fertile, has a dense agricultural and industrial population amounting to 288 per square mile. The great agricultural region of Russia is found in the steppes. This is largely known as the 'Black Earth'

region. It has a moderate rainfall and produces all kinds of grain, and large crops of sugar beets. The population is from 120 to 230 per square mile.

The People

Just as varied as the physical features of the country are its inhabitants. The different peoples have through years of conquest become united to form one nation, but they are still far from being welded into one race. There are wide discrepancies in language, physical type, customs, dress, and religion. The two main races in Russia proper are the Indo-Europeans in the south-west and the Finns in the north-east, the Finns being an offshoot from the Mongolian race. Russians or Slavs of Aryan or Indo-European descent amount to about 75% of the population of European Russia. They are members of the Greek Catholic church, of which several sects exist, and they are divided into three stocks.

The Great Russians, numbering about 52,000,000 in European Russia, live in territory from which they have driven the Finns, with which people they are somewhat mingled, and thus occupy northern and central Russia, including the north-eastern part of the 'Black Earth' region, and also territory in eastern and south-eastern Russia from which they have driven the Tartars. Physically they are blond, blue-eyed, and vigorous, with broad shoulders and bull necks, often somewhat clumsy, and with a strong tendency to corpulency. Their character has been influenced not only by a long history of subjugation to feudal despotism, but also by the gloomy forests, the unresponsive soil and the rigorous climate, and especially by the enforced inactivity of the long winters. In disposition they are melancholy and reserved, clinging obstinately to their traditions, and full of self-sacrificing devotion to Czar, Church, and feudal superior. They are easily disciplined, and so make excellent soldiers, but they have little power of independent thinking or of initiation. The normal Great Russian is thus the mainstay of political and economic inertia and reaction. Even the educated Russian gives apparently little response to the actual demands of living. He is more or less the victim of fancy and temperament, which sometimes lead to a despondent slackness, sometimes to emotional outbursts. Here we have the explanation of the want of organization, the disorder, and the waste of time, which strikes the Western visitor to Russia. This pessimistic outlook finds expression in the word which is forever on Russian lips—'Nitchevo,' 'it doesn't matter.'

The White Russians number about 6,000,000, and probably derive their name from the white color of their clothing. They

occupy the provinces of Minsk, Mohilev, Vilna, Vitelsk, and Grodno. They are the poorest and least advanced of the three Russian stocks.

The Little Russians, numbering 20,000,000, are settled in the 'Black Earth' district or Little Russia proper, and in the Ukraine, which includes the provinces of Kiev, Poltara, Kharkov, and Tchernigov. They have also spread into Galicia and north-eastern Hungary, and have colonized in other directions. They are slender and dark, with the emotional southern temperament, and speak a dialect different from the other Russians.

The Cossacks are not a distinct stock, but are descended from the refugees and outlaws that occupied frontier districts between the settled and the nomadic tribes. They were afterward organized as a frontier militia and as a light cavalry. The Cossacks are found in the valley of the Don, in the Urals, and in Siberia.

Other peoples. About 8,000,000 Poles are found in western Russia. Other races included within this vast nation are the Letts, 1,400,000; the Lithuanians, 1,200,000; Germans, 2,000,000; Swedes, 370,000; Rumanians, constituting the bulk of the population in Bessarabia, 1,000,000; Bulgarians and Greeks, who are fairly numerous in southern Russia; Jews, 5,100,000, until recently not permitted to live in either Great Russia or East Russia, speaking a German dialect mixed with Hebrew, but also familiar with the Russian language; Mongolians, of whom there are said to be 9,000,000 in Russia proper, and many more in Siberia; 170,000 Kalmucks of Mongol blood professing the religion of Lama; the Ural Mountain people, 5,400,000, consisting of eastern Finns, which includes the Ugrians, the Permiaks, the Syryenians, the Samoyedes, the Volga Finns, the Votyaks, and the western Finns, amounting in all to nearly 4,000,000, including the true Finns, the Esthonians, the Lapps, the Tchudes, and the Livonians. There are also Mohammedan Turks,Tartars of various branches, Bashkirs, Kirghizes, and many others, including Georgians, Lesghians, Daghestanians, and more besides. It will thus be seen that, if in America we have a melting-pot of nations, in Russia there is a racial volcano from which eruptions may be expected for a long time to come.

Economic Conditions

Russia, by virtue of its geographical situation, its natural features, and its history, is a land of raw products, although in the past 50 years the manufacturing industry has developed rapidly. Fully 80% of its population lives by agriculture, yet only 26.2% of the total area is under tillage, and 15.9% is devoted to

gardens, meadows, and pastures. Forests cover 28.8,% and 19.1% is wholly barren. The manufacturing industry is as yet of minor importance. There is a great lack of native capital and of competent workmen. The products are limited to articles of common use for distribution in Russia and in central Asia. In Poland the predominant industry is the manufacture of cotton and other textiles. One important industrial district in central Russia extends on the south from Moscow to the coalfields of Kaluga and Tula, on the north to Tver and Yaroslavl, and on the east to Ivanovo and Vladismir. The chief manufactures here are textile and metal wares, together with wooden articles. The iron industry of southern Russia, where coal and iron are found together in the Donetz basin, has already materially decreased the imports from foreign countries, and a few years before the War it developed a small export trade. This district now has a production twice as great as the old and famous iron district of the Urals, where charcoal and lignite were used for fuel.

There are manufacturing establishments producing cotton, metal wares, machinery, and chemicals in the cities on the Baltic, such as Petrograd and Riga. In Finland the great abundance of timber and water-power support wood-pulp, paper, and other industries, and in the steppe-region are flour mills and beet-sugar factories.

The railroad system of European Russia is nearly as large as that of Germany. Considering mileage alone, 25,447 miles were open for traffic on January 1, 1912, but the ratio of mileage to area was one mile of railroad for every 59 square miles of territory, which is less than for any other country except Norway. The United Kingdom has one mile of railroad for each 5.3 square miles; Germany one mile for 5.8, and the United States one mile for every 15.7 square miles. The Russians use a broader gauge than the other railroads in Europe and this difference is a serious obstacle to through traffic.

The people of Russia, including the Jews and nomads, are divided into four classes: nobles, officials, clergy, and peasants, the latter including the laborers. The really sharp distinction, however, is that between the great mass of the people on one side and the hereditary and official nobility and the burgess class on the other. The upper classes are noted for their luxury and extravagance, and for their reckless gambling, their better side showing itself in their unlimited hospitality. The lower classes live in unspeakable poverty and destitution. Beggars are numerous and troublesome, especially in the vicinity of churches. At the present time conditions of living are most difficult. With the declining value of the Russian ruble, which is normally worth

51c., and which is now quoted at about 14c., with its actual purchasing-power still less, together with the extremely high prices asked for whatever small stocks of supplies still remain in the hands of the merchants, it is a wonder how the ordinary individual can support himself and his family. A pair of boots costs from 100 to 200 rubles, and can be obtained with difficulty even at such prices. Food of all kinds is scarce in the larger centres of population, and can be obtained only in limited quantity by means of bread-cards, sugar-cards, and the like. A lemon or a small apple costs from one to two rubles. A Russian pound of strawberries, which is nine-tenths of a pound avoirdupois, costs from two to four rubles. These strawberries, by the way, are the finest I have ever eaten. I saw canteloupe selling at 40 rubles; cucumbers, of which the Russians are very fond, at one to two rubles each. No white bread was to be had in even the best hotels in Petrograd and Moscow for a number of weeks before my departure. The Russian black bread seemed to be composed of tar and cobblestones. I broke two teeth upon this locally esteemed Russian delicacy.

Official Graft

The government owns the telegraph service and many of the railways. The managers of these public utilities are Government officials; yet it was the universal practice for the telegraph companies to exact three times the regular rate for a telegram, saying that there was great congestion and that a telegram must be rated as 'urgent' in order to receive attention. After accepting triple payment these Government officials would perhaps put a postage stamp upon the telegram, or would pay no further attention to it whatever. Occasionally telegrams from Petrograd to the Causasus would come through in 10 days. Occasionally they arrived after three weeks and frequently not at all. Likewise with the railway officials. I paid several hundred rubles to have my baggage transported by railway from Petrograd to the Caucasus. On arriving at the Don river, where a bridge was out, I found thousands of soldiers fighting for a chance to cross upon the small steamers, and there was no possibility of getting my baggage across unless I took it myself. I was told that the bridge might not be repaired for a month, but that the baggage would eventually be forwarded. Having heard so many tales of the loss of baggage I took my trunks from the possession of the railway company on the west side of the river Don, and at an expense of 300 rubles and after much labor, I got it across the river and presented it to the officials of the same railway on the eastern side of the river. These officials informed me

that having once taken my baggage from the custody of the railway, it was again necessary to pay several hundred rubles to get it carried to its destination.

I could relate many instances of Governmental graft that came within my own experience or that of my friends. Every merchant who has succeeded during the last three years in getting merchandise ordered for the Government or for private consumption from Archangel or Vladivostok to Petrograd will tell of innumerable instances in which he has been obliged to pay extortionate graft to the railway officials before he could get a car in which to forward his freight. At the time of leaving Russia factories were closing, and all kinds of business was rapidly coming to a standstill. The workingman has no conception of a limit to what he may demand. Pay has been increased and hours shortened again and again. Efficiency, which was never great, has fallen off to such an extent that no one can operate at a profit, notwithstanding the high prices commanded by his products. Take for example the cost of mining coal in the Donetz basin; before the War this may have been at most three rubles, or $1.50 per ton. At the present time the cost is not less than $8 gold, and is probably nearer $12. Manufacturers in this district are losing money. They are required by the Government to continue operating, and as a result they are borrowing from the Government to meet their payrolls.

The Political Situation in the Autumn of 1917.

Politically the situation in Russia is decidedly mixed. There are many different parties and no one can say which will secure the adherence of the mass of the people. These parties include the following:

First: Anarchists.

Second: Quite similar to the anarchists, but denying this appellation, since the object of the anarchists was to establish a Government without laws and primarily to overthrow the Czar's regime, which has been accomplished, are the Maximalists or Bolsheviki. These Bolsheviki are extreme socialists who demand confiscation of all kinds of property without compensation and the carrying on of all business by the Government.

Third: Minimalists or Mensheviki. These are socialists whose programme includes the taking over of all forms of business by the Government, and involves Government ownership of all lands now in private estates, but they do not demand that this be done without compensation to the present owner.

Fourth: The Social Revolutionists, whose programme is still somewhat more moderate.

Fifth: The Labor Group allied with the previous two, but concerned more with labor questions than with the question of land ownershhip.

Sixth: The National Freedom party, the 'Narodniki', or Liberal party, of which Miliukoff, Lvoff, and others are members.

Seventh: The Octobrists, or Monarchists, who believe that Russia is not yet ready for a democracy and who wish an autocracy to be re-established.

Eighth: The extreme right or supporters of the old Czar, Grand Dukes, and the rest.

The Bolsheviki are the most dangerous and make the most noise. They are the disturbing element; they consent one week to the authority of the Provisional Government and the next week, because this government does not act in all respects in accordance with their demands, they revolt against it. The Liberal party has been forced into the background. Its members are some of the finest men in Russia, but they are persons of markedly Russian type, lacking in both determination and executive ability. These men had for years spasmodically striven to educate the people and to bring about political reform. When the revolution was accomplished they were appointed Ministers under a Provisional Government, and had it not been for the strong socialistic tendencies and propaganda of the soldiers and workingmen, there would have been established in Russia under their guidance one of the most advanced democracies of the world. Miliukoff is a splendid character. He was lecturer on international law at the University of Chicago. He has traveled. He is a magnetic speaker, and is one of the finest men in Russia today. Fearless and honest, he, it was, who at the risk of his life, denounced in the Russian Duma the former Prime Minister Stuermer who was accused of being a German spy and a traitor to Russia, and who is said to have died in Petrograd on the eve of his trial for treason. The former Minister of War, Sukhomlinoff, has been condemned to life imprisonment for betraying his country; and Protopopoff, former Minister of Railways, is still awaiting trial. These men were accused of being in the pay of Germany, and are said to have been directly responsible for the loss of hundreds of thousands of Russian lives.

The Future

Now, as to the future: Americans are interested to know what can be expected of Russia, first in the present War; second, as a land of opportunity after the trouble. Russia is no place today in which to set on foot new industrial enterprises. Labor is too scarce, too inefficient, and too expensive. Titles are in-

secure until we know whether or not the socialistic programm is to be carried out to its full extent. Taking a broad view, should say that Russia is a land of opportunity.

Practical consideration of the favorable side of the cas needs to take into account, (a) that the great territory of Russi and Siberia is the largest undeveloped domain. Other things be ing equal and favorable, it presents the largest field for explora tion and the investment of capital; (b) it is in the north temper ate zone, and covers a wide range of climate and latitude. It products are as varied as those of the United States, both in min eral and agricultural wealth. Its population, which is already near ly twice as great as ours, is rapidly increasing; (c) whatever th form of its future government, the country is now on the eve o great development, and will furnish a market for all forms o products, especially those which can be manufactured and pro duced within its borders; (d) the people are friendly by nature and especially friendly to Americans. They are also moderate and will, I think, with a little education, be fair in their dealing with us; (e) prohibition prevails throughout the land, and ther is no disposition to make a change in that respect; (f) althoug there is need of money for large undertakings, there seems, nev ertheless, to be an abundance for the purchase of every-day ne cessaries and luxuries.

The unfavorable factors are the following:

(1) *Governmental and political*: (a) The present Govern ment, which is frankly provisional, will exist only so long as i holds the confidence of the soldiers and the people. The or ganized force behind it has limited power for compelling obedi ence to its mandates. Under the guidance of patriotic men wh seek only the common good, it finds itself obliged to decide be tween the selfish and conflicting demands of the various classe of society, many of whom, especially the peasants and laborin men, have not the slightest conception of the meaning of th words 'freedom' and 'democracy'. The ship of state is in peril ous waters, and requires a skilful skipper. Among the tempor ary ministers are representatives of all classes with the possibl exception of the peasants, and an occasional clash of interests i unavoidable. The socialists demand the distribution of land formerly held by the Cabinet and now in large estates (two dif ferent varieties of large holdings); the laboring men clamor fo concessions and privileges which they believe are enjoyed b laborers in other countries; the tribes are demanding freedom and even rising in revolt to obtain it, although lacking entirely in the ability to govern themselves; and the soldiers have an idea that 'freedom' means that they can have everything without

price, and, often in large numbers, are riding on street-cars and railroad-trains without paying fare; and while there is rejoicing over what has been accomplished, there is also unrest and apprehension for the future. (b) The concessions which have already been made to the Poles and Finns, without requiring any guarantee of future support and allegiance, are felt by some to constitute a menace. The same may be said of the privileges thus early granted to the workingmen. (c) The old Russian laws, most of which remain in force, are cumbersome and inapplicable to business. Until they are revised, new enterprises will of necessity be undertaken with great caution. (d) The Jews, who are returning to Russia in great numbers, and who have long exerted an influence beneath the surface, are now becoming more outspoken and often arrogant. Their presence will be valuable in a way, for they are already acquiring property which formerly they were forbidden to hold, and will not favor the confiscation of real estate, but if they become too bold and prominent disturbances will arise from existing racial antipathies.

(2) *Practical Difficulties.* (a) The most obvious difficulty in the way of business at present is the lack of transportation. The railway systems are totally inadequate. Rolling stock is out of order, and little effort seems to be made to repair it. Repair shops are needed, but even if provided there would be no mechanics to fill them. There is a shortage of every conceivable commodity all over the Russian dominions. It is impossible to get freight forward. Most of the available cars and engines are needed for transporting troops and war-supplies. Hundreds of thousands of tons of freight have been lying for months at Vladivostok without means of moving it to the western centres of population. Nothing but war-supplies may be brought over the railways from Archangel and Mourman. There are but few wagon-roads, and those very bad. The railroad from Sweden is almost useless for handling freight since the neutrality laws forbid the bringing of supplies that way. What is most needed just now is 10,000 American railroad men and mechanics to build shops and repair the rolling-stock already on hand and to operate the Siberian road properly, and thousands more of new cars and hundreds of locomotives from the United States; but to such a programme there is an objection which will be mentioned later. Transportation now is frightfully slow, and this applies as well to passenger traffic. The American railroad commission is doing much to improve the situation, but it is still bad. (b) In the next place there is a lack of men for almost every kind of work, and when they can be hired they are arbitrary, expensive, indifferent, and unreliable. (c) There is an inordinate number of

holidays, about 30 under the old regime, each lasting from a day to a week, and during these festal occasions laborers of all kinds refuse to work, stores are closed, the postoffice goes out of business, hotels and restaurants refuse to serve meals, and industry is out of joint. (d) The Russian workman cannot be said to be particularly industrious or efficient. He has little initiative and less executive ability. For ages he has been dependent upon his master, has earned little more than his keep, and has not learned to think for himself. His ideas now are greatly confused, and he spends a considerable portion of his time discussing with his mates the wonderful thing that has happened and what to do. The results of his deliberations are sometimes grotesque indeed. Whatever the outcome, the present effect is low efficiency and poor discipline. (e) In these days when the people see property of various kinds being confiscated by the new Government, they are apt to believe that there is no limit to possible confiscations. There is a desire on the part of the proletariat to take from those that have and give to those that have not; and there is fear on the part of those who have that they will not long be permitted to own and enjoy that which they possess.

In spite of the inability of the Russians to furnish all the supplies needed for the army and at the same time provide ample supplies of food, fuel, clothes, and other necessaries for the non-belligerents, there is an insuperable reluctance to permit Americans or anyone else to perform this service for them. In their pride and in their desire to develop their own resources they object to the introduction of foreign labor or manufactured products. Thus they are in dire need of railways, but in their charters for new roads they always require the use of rails and other structural materials of Russian manufacture, even though it is quite apparent that these cannot possibly be obtained. They need skilled men in their shops and factories and for operating their railroads, but will not permit them to be imported even for the time necessary to put things in order. Under these circumstances it will be next to impossible to render them the greatest service within our power.

In summing up the Russian situation I will quote a well-known Moscow merchant now in this country: "Day after tomorrow Russia will be all right, but there may be a long day and a couple of dark nights in the interval."

To the business man I would say: "Keep your eyes on Russia, but your money out of it for the next few years." To the younger man, students of business and of engineering: "Study the language of Russia, become familiar with its history, its geography, its people. The time is near when such knowledge will be valuable and will command high wages and will offer rich rewards in the opportunity to take an active part in the development of a great nation."

PRONUNCIATION OF CERTAIN PLACE NAMES

By Roland M. Harper
College Point, N. Y.

OF THE thousands of geographical names of Indian origin in the United States, probably the pronunciation of the majority has changed little if at all since colonial times, being passed on by word of mouth from one generation to another and by many persons simultaneously, including numerous illiterates who are not influenced perceptibly by printed words; while the spelling of some of them has undergone many transformations in the efforts of different writers to fit English syllables to Indian sounds. With the increase of text-books and other geographical literature many place-names are put into circulation, as it were, in distant parts where readers may have no guide to the pronunciation except the spelling, which is often capable of different interpretations, especially in the matter of accent. And if a teacher happens to guess the pronunciation wrong and pass it on thus to his or her pupils they are likely to carry the wrong impression through life, unless they visit the place in question or meet some one who has been there, for habits of speech formed in school are hard to break.

One of the most frequently mispronounced geographical names is Arkansas, the name of a river and state, and part of the name of a few towns, such as Arkansas City, Kansas. The French exploring expedition under LaSalle in 1680 found on the west side of the lower Mississippi River a tribe of Indians calling themselves (according to simplest possible spelling) *Akansa* or *Arkansa*. When their territory became a French colony the geographers of that nation added an 's' to the name, presumably for the sake of appearances only, for a final 's' in French is silent.* When it was acquired by the United States through the Louisiana Purchase in 1803 the spelling 'Arkansas' had come into pretty general use, though as late as 1821 the naturalist Thomas Nuttall published a "Journal of travels into the Arkansa territory."

After Kansas was admitted to the Union, in 1861, it was natural for uninformed people several hundred miles away to suppose that Arkansas was a mere variation of it, and rhymed with it. (It is noteworthy, however, that on some maps Kansas is spelled, 'Kanzas', as if to emphasize the difference in pronunciation between it and Arkansas.) This misconception became

*See R. H. Loughridge, Tenth Census U. S. 5:545 (footnote). 1884. The French about the same time applied the spelling 'Tensas' to a river in southern Alabama, formerly spelled Taensa and now Tensaw.

so widespread, and the citizens of the older state so wrought up over it,* that in 1881 the Arkansas legislature sought to check it by defining the pronunciation by statute; and this did serve the purpose to some extent, as persons who were in school then or previously may remember. The statute said nothing about the name of the river, however, that presumably being taken for granted; and as late as August, 1917, (as well as twice in 1915) one of the most influential newspapers in the Middle West, located not more than 200 miles from Arkansas, published a statement, in reply to queries, to the effect that while the name of the state was 'Arkansaw', the river and city were pronouncd 'Arkanzas.'

When it was pointed out by the writer to the management of that paper that it was inconceivable that the intelligent citizens of Arkansas should pronounce the name of their principal river differently from that of the state, and that the correct pronunciation was well known if not universal as far up the river as Colorado,† they refused to admit their error, and pretended to believe that even in Arkansas itself the incorrect pronunciation of the name of the state prevailed, regardless of the action of the legislature. Very likely the false form has gained a considerable foothold in Kansas (through which the Arkansas River flows for several hundred miles), and it is certainly still heard in other parts of the country, especially among persons with inelastic minds; but a pronunciation based on such evident misconception does not deserve to be perpetuated, and readers of this journal should strive to discountenance it whenever it "shows its head."

There are numerous other place-names in the United States that have been frequently mispronounced or are likely to be on account of their more or less misleading orthography or peculiar accent, and a few of them will be discussed here. The majority are in the southeastern states, and not all of them are of Indian origin.

Accomac, a county in Virginia, does not rhyme with Potomac, but is accented on the first and last syllables.

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*The erroneous pronunciation may have been fostered also by the same sort of spirit that prompts northern writers of alleged southern dialect stories to pretend to believe that southern people, and especially negroes, use "you-all" in the singular; a belief which is quite unfounded.

†Persons who have lived or traveled in those parts testify that the correct (original) pronunciation of the name of the Arkansas River is about as common in Oklahoma as in Arkansas, and is by no means infrequent in Kansas and Colorado.

Alabama is pronounced with the accented syllables short, though many people in the northeastern states insist on calling it 'Ahlabahma', even after they have visited the state and had ample opportunity to learn better.

However, *Alachua*, the name of a county, town, and intermittent lake in Florida, is locally pronounced 'Alahchuay'.

Alapaha, a river in southern Georgia, is accented on the second syllable, and pronounced as if it were 'Alappahaw'.

Atchafalaya, a river in Louisiana, is accented on the second and fourth syllables, and the former is short and the latter pronounced like long i.

Both North and South Carolina have seaports named *Beaufort*, but the former is pronounced 'Bofort' and the latter 'Bufort'.

Choctawhatchee, a river in Alabama and Florida, is pronounced as if it were hyphenated in the middle.

Conecuh, a river and county in Alabama, is pronounced 'Conaka', with the second syllable long and accented.

Coweta, a county in Georgia, is pronounced as if it were hyphenated in the middle, the second syllable long and accented.

The first syllable of *Duplin*, a county in North Carolina, is long, as in duplicate.

Edisto, a river in South Carolina, has the first syllable short and accented, and the same is true of *Etowah*, a river in Georgia and county in Alabama.

Houston County, Georgia (named for John Houstoun, an 18th century governor), and Houston, Florida, are pronounced "Howston', while *Houston* County, Alabama, (named for George S. Houston, governor in 1874-1878), like Houston, Texas, is pronounced 'Hewston'.

Kissimmee, Florida, is accented on the middle syllable.

Bradford Torrey, in his charming little Florida Sketch-book, 1894, (p. 190) expressed some surprise, if not derision, at hearing the name of *Lafayette* County accented on the second syllable; but if he had gone to Lake Lafayette, Fla., Lafayette, Ga., Lafayette, Ala., or Lafayette County, Miss., he would have heard the same pronunciation.

Louisville, Georgia, and *Louisville*, Kentucky, are both county-seats of Jefferson County, and are about the same age (the former was capital of Georgia from 1795 to 1807, when the center of population of the state was nearest to it), but the 's' is pronounced in Georgia (and perhaps in a few other states which have places similarly named), but not in Kentucky.

Lowville, the county-seat of Lewis County, New York, is pronounced 'Loville' even by many residents of the same state,

a very natural error; but the first syllable rhymes with cow.

Miami, Florida, has the first syllable long and the second short and accented (not 'Mee-ahmi' as some northeastern people would have it).

Micanopy, Florida, is pronounced 'Mick-a-nopy'.

Muscogee, a county in Georgia, is accented on the second syllable, and the 'g' is hard.

Although the writer had long been accustomed to a short 'a' in the penult of Alabama, Colorado, Indiana and Montana, he somehow imagined that Nevada was pronounced 'Nevahda', until he went west in 1915 and learned better.

Ocala, Florida, has the middle syllable short and accented.

Ocklawaha, a noted river in central Florida, is pronounced 'Ockla-waw-haw', with the accent on the penult. (In recent years some careless people have been leaving out the 'c', thus giving the impression that the first syllable is long as in Oklahoma.)

Ocmulgee, a river in Georgia, has the first syllable long and the 'g' hard.

Perquimans, a county in North Carolina, has the second syllable short and accented.

Taliaferro, a county in Georgia, is pronounced 'Tolliver'.

Tohopekaliga, a lake in Florida, has the second and fifth syllables long and accented.

In editions of the New International Encyclopaedia previous to the latest (1914-1916) the impression is given that *Tucson*, Arizona, is pronounced as it looks. But every one who has stopped there or had oral communications from there knows that the 'c' is silent and the second syllable accented (though short).

Tuskegee, Alabama, has the middle syllable long and the 'g' hard.

Wekiva, a name applied to two or three large springs and short rivers in Florida, is pronounced 'Wekeva', with the accent on the second syllable.

Tides of the Bay of Fundy

The Hon. James White of the Canadian Commision of Conservation informs us that the tide in the Bay of Fundy rose 57.6 feet at the time of the Saxby storm. This was officially determined and holds the record as the highest known tide in the Bay. Frequently quoted reports of tides 70 feet in height are incorrect.

STREETS OF CITIES

By Frederick Homburg
Woodward High School, Cincinnati, Ohio.

THE old characteristics which marked the difference between town and village no longer exist, and it is somewhat difficult to give a satisfactory definition of either term. The walls and gates of medieval times have been swept away; and with their disappearance the difference between city and country has become hazy and indistinct. Size and population are no longer criteria; there are settlements in Africa marked on the map which differ in no other respect from unmarked humble villages of which they are merely aggregates. Some would base the difference on charters; but the chartered privileges of many towns of old, such as markets and fairs or the exclusive right of town guilds in certain lines of manufacture no longer exist.

Why Towns Were Built

Let us ask: What were the objects of settlement? First and foremost came considerations of security, the gregarious instinct, which impelled men, like animals, to flock together for mutual aid and protection. At one time fortifications were the characteristics of towns; now, most towns are open, for what is not defended cannot be attacked. Of course there are still fortified towns, but this is incidental to their strategic position. Next to safety came the opportunity of producing and handling goods and hence as much accessibility as was consistent with safety.

A village location is fixed by the soil to be cultivated or the mineral to be mined and by opportunity of marketing the raw products. Some manufacturing may be carried on in some lands in the open country, but this is vastly different from the organization of skilled labor in towns. For towns, ease of production and of approach are prime considerations, because of securing raw products and disposing of manufactured ones. Town dwellers, then, are not producers of raw material; but they are interested in manufacture on a large scale, in commerce, in government, in special functions, etc.

Ease of Movement Necessary

It follows that in a town, every obstruction to trade and industry, rapid transit and easy communication, must be removed, and that therefore city streets are very different from country roads. In many sections of Europe the difference is not so marked as in more recently settled countries; indeed, the Romans were the best road builders, many of their roads having borne

traffic since their construction before the beginning of our era. City streets because of intensive and continuous use must be well paved. For this purpose all sorts of material have been tried, and each has some special advantage: wood blocks treated with some preservative, granite blocks, brick, asphalt, cement, etc. The streets must be somewhat convex and slightly inclined so as to drain well, and be furnished with sidewalks for the accomodation and security of pedestrians. In congested parts, traffic must be regulated by authority to avoid the annoying stoppages of former days; hence so-called traffic officers are stationed at important crossings. Underneath the street, the ground is tunneled for all sorts of purposes: sewers, water mains, high pressure service, gas mains, electric conduits, etc. The surface must be kept clean; perishable waste must not be left to the disposal of scavengers (as has been done in some towns in warmer regions); nor must we wait for the elements to remove dust, mud or snow. Streets are sprinkled and swept usually by night to avoid interference and annoyance. The removal of a heavy snow may cost a city thousands of dollars; but this is regarded as money well spent, for the hindrance to traffic would mean a much greater loss.

The Plan of Streets

The natural plan for the streets would seem to be the radial; for country roads lead to town from all directions. It would be a small place where the converging roads would suffice; so in the newer settlements and in modern additions to old towns, the rectangular block system or the checkerboard scheme prevails. Some claim that this is patterned after the Roman fortified camp; but would it not be fairer to suppose that the military leaders of Rome took the hint from the towns, (for *Roma quadriata* existed before the *castrum*), and that later on, reasonable beings would strike the same simple scheme for similar practical reasons? In planning new settlements there are no property rights to be regarded because none exist; and the determining factors are traffic and convenience.

Of course shore lines and contour lines may compel modifications of the scheme; but as a rule the rectangular blocks are so characteristic of American towns that distances are correctly gauged by blocks, so many to a mile, etc. Usually streets are in the direction of meridians and parallels; but diagonals (i.e. N.E to S.W. and N.W to S.E.) would give the same scheme, and, according to some, would be far better, inasmuch as the sunlight received by windows would be more evenly distributed. Here are the diagrams:

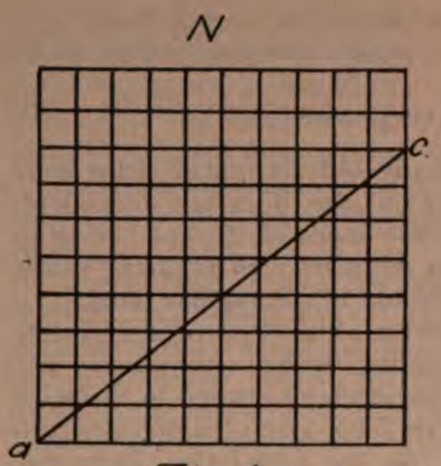

Fig. 1

Fig. 2.

Usually streets are straight; although circular streets have been planned like belt lines on the outskirts of a town. The models for these will be explained below. Winding ways are often used for variety and beauty in parks and park-like suburbs; otherwise crooked streets are found in old parts of old towns. Europeans traveling in the United States (and in other recently settled countries) have remarked in tones of complaint, that the sameness of our cities is wearisome, that they are constructed according to one pattern, that they change in the same way because improvements (real or imaginary) are copied by all, and thus they resemble each other like the dress of civilized people, who all follow the dictates of some autocrat of fashion. Some cities like Boston, an historic old place, and Washington, a carefully planned one, are acknowledged to be different from the general run and on that account more interesting. How different, these critics say, are the cities of Europe; there each town has an individuality all its own; and its history may be read in its streets and its buildings. When you awake in an American hotel you must study in what town you are, towns and customs are so uniform.

Some of our railroads have issued folders giving diagrams or plats of the business portions of the chief cities on their lines. This is an excellent way of advertising, for it calls attention to the importance of the system, and it is a help to the traveler. A glance at such a series of plans next to each other will give an impression of monotony and serve to justify the criticism above. Most oriental towns have an individuality that cannot win admiration. Often, as for example many towns in China, the places are surrounded by walls, in many cases of great pro-

portions; so their outline or perimeter is very regular, but within irregularity is the rule; especially annoying are the many blind lanes.

Old Cities of Europe

It must be acknowledged many old European cities have their own picturesque character; but this does not depend altogether on age. One of the oldest towns of Europe, Turin in northern Italy, whose foundation dates back to Ligurian times, is in all respects a modern city laid out in rectangular blocks.

The crooked or winding streets of a town of the Middle Ages were considered of advantage for defensive purposes. The wall which defended and at the same time hemmed in the town was often circular, because a circle for a given length of perimeter encloses the largest area. As the population increased, space became precious; the girdle did not yield and the city grew toward the sky. This accounts for the tall buildings, the projecting upper stories, the narrow streets, etc. Conditions were most unsanitary; refuse was thrown into the dark streets, and the ditch about the wall was the receptacle of all offal. All this was changed when the fortifications, becoming unnecessary, were removed. The broad circular space thus gained was not built up, but wisely turned into parks, promenades, drives and speedways. This is the origin of the justly celebrated Parisian boulevards, the elegant Ring Street of Vienna, and other beautiful streets of European cities. Thus, from both sanitary and esthetic points of view, an ancient curse was turned to a modern blessing.

Various Plans

Example is contagious, and even in business-like America we recognize the importance of esthetic considerations in street construction. We might raise the question: Is our prosaic checker-board scheme the best for all purposes? For orientation it is the simplest plan; but for attractiveness the city of Washington has radial streets, affording views of public buildings, interesting monuments, pretty parks; while strategic reasons guided Napoleon III in planning slanting avenues for Paris so that barricade fighters could be overcome by artillery sweeping the streets from centers. The very practical reasons of saving time and energy led some cities to construct radial streets. Suppose in Fig. I you wish to go from A to C; in the rectangular system you would be compelled to go along the sides AB and BC of the right angled triangle abc, or a broken line equivalent to the sum of these sides, while the hypotenuse AC is the straight line which joins the two points and hence the shortest distance.

A number of towns as, for example, Karlsruhe, Baden, and Madison, Wis., have a circle or square or plaza or park and public buildings at the center and streets radiating from this center. As the diagonals diverge, a comparatively small portion of the town is benefitted by them, so that these places in additions and suburbs revert to the rectangular plan, while in some larger cities, as Berlin and Washington, there are several centres.

There ought to be some combination of the perpendicular, horizontal and diagonal that would enable one to avoid traversing unnecessary space. Some imagine they see in hexagonal blocks, a beehive system, the plan of the city of the future. A glance at the diagram Fig. 3 will show that at street corners with three radiating streets, orientation will be perplexing; and with no thoroughfare there could be traveling in straight lines in no direction save the short distance of one side of a block.

Fig. 3.

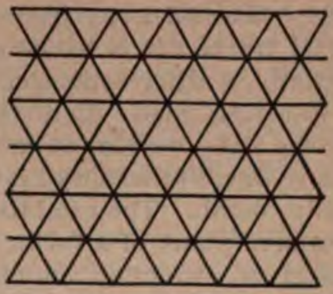

Fig 4.

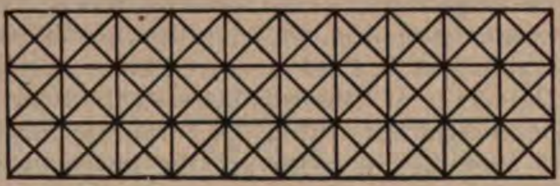

Fig. 5.

With two sets of diagonal streets crossing at angles of 60° combined with one set of horizontal lanes bisecting the 120° angle there would be formed blocks in the form of equilateral triangle with six rays from a center as shown in Fig. 4.

A better plan would be the combination of perpendiculars, horizontals and diagonals obtained by superposing Fig. 2 on Fig. 1, thus constructing blocks in the form of right angled triangles, such as are in vogue in some towns in France, Holland and Bel-

gium. There would be eight rays at some corners, four at others, thus avoiding the monotony of the hexagonal system.

In this construction squares might at intervals be used as parks or playgrounds or for markets or plazas, and half squares (opposite triangles) might be put to such use. Thus we could continue showing modification of old plans or the constructions of new ones. That, however, would be waste of time and space, because it is easy to draw regular plans on paper, but often difficult to apply them to actual situations. It is therefore best not to be bound rigidly to any geometric scheme but to make allowance for roads already in existence, for inequalities of the ground, for waterways and other obstacles.

Streets should be broad to accommodate traffic, furnish room for rapid transit, afford more air space, etc.; but, if, in planning a town, space is dealt with too lavishly, a city of magnificent distances will result, and that means waste of time and energy.

Ideal conditions would be found where new settlements are to be planned away from any body of water on level or nearly level tracts. It is by no means certain that a town will grow equally in all directions and it is not easy to foresee what part of a carefully made plan will be most quickly developed. Some towns have developed in one direction, having grown along a shore line, so that they appear stretched out in one direction with little depth. The establishment of a railroad station, of a government plant, of a factory, of a market may and does have the effect of attracting population and thus developing a certain quarter. The development of residential suburbs depends quite frequently on the direction of the prevailing wind, because this will drive smoke and bad odors away from the favored locality.

Different street systems are merged when a large city in expanding absorbs neighboring small towns. Where two cities coalesce without amalgamating, we have the case of twin cities of which Minneapolis and St. Paul are a well know example. The campus of the University of Illinois is between the twin towns of Urbana and Champaign, but within the corporate limits of the former. Futher examples of twins are the towns on the borders of states, like Texarkana (Tex. and Ark.) which cannot fuse because they lie in different commonwealths. State lines prevent the absorption of a number of small towns by a large city, of which industrially and commercially they are a part; thus New York cannot annex Jersey City or Hoboken, nor St. Louis East St. Louis, nor Cincinnati, Covington and Newport and a number more. Detroit lies in Michigan, and the town of Windsor across the river in Ontario is actually foreign. However, New York, by expanding and absorbing New York corporations, thus forming Greater New York, maintained its position as chief city of the Western Hemisphere.

THE GRAPE HARVEST IN ASIA MINOR

By Isabel M. Blake
Hampton Institute, Hampton, Va.

THE grapes of Asia Minor have a greater food value than most of our species, being more meaty and substantial. The peasants almost live on grapes and bread during certain seasons of the year. The district just south of the Turus and east of the Amanus Mountains, west of the western-most bend of the Euphrates and north of Aleppo is one of the most famous grape regions of the Turkish empire.

With the Armenians, the beginning of the grape harvest is at "Water Easter," early in August, a festival in commemoration of Gregory the Baptizer, founder of their church. On this day, the people are wont playfully to "baptize" each other in the streets, and the fountains are surrounded by groups of merry, dripping children, who make a game of throwing water and dodging it. On that day, also the people first repair to the vineyards, as there is a superstition, strictly observed, that grapes should not be gathered before this festival. On that evening, for the first time of the year, donkeys bring home baskets loaded with the juicy fruit, and every peasant whom you meet will offer you a bunch of the first-fruit of his vineyard.

For those of the city people who own vineyards, the grape-harvest constitutes the summer outing. They live in their vineyards for several weeks, enjoying the fresh air and freedom, and gathering the different choice varieties that succeed each other, such as the "Bubble", a delicate white grape from which the skin may be removed, or the "Colonel," a hard, rich, ruddy kind.

In October comes a species that is not considered edible, but, being small, tasteless and very prolific, is used in the manufacture of grape sugar, and sweet-meats. It is interesting to visit the place where this process is going on.

Several owners of vineyards generally combine to build a crude sugar refinery. This consists of a row of stone huts where the workmen sleep, a stone or iron kettle, into which the grape-juice runs through great troughs, from the press where it is tramped out by the feet of workmen. It is a comfort to notice that these men always wash their feet carefully before entering the press, so that perhaps one ought not to object to this method of working, any more than to a cleanly woman kneading bread.

The juice is boiled and skimmed in great kettles, and the whole place reminds one strongly of a maple sugar camp, except for the difference in season, and in the product. This last is a very delicious molasses. Sometimes it is boiled down and beaten

till it is almost as hard as butter and is very light. It is called *pek mez.*

At this time of year every home becomes a candy factory. The art of making the grape-juice sweets requires great skill, and the women who can do it acquire special fame. It is the custom for several related households to gather in the court-yard of one, and manufacture all the sweets to be laid up for consumption that year. When they have finished at one house, they all gather at the next. For three weeks, all members of all the households are busy making rounds, helping to prepare the sweets, under the direction of the most skilled members of the family. The whole time and the entire house of any one family is given up to this process, and afterwards, there is a grand house-cleaning.

It is worth while to visit a court-yard where this is going on. In one corner is a stone fire-place over which is a huge iron tub, full of the boiling juice. At a certain stage, starch is mixed with this to give coherence to the sweets. These are of different forms. Whole bolts of white cotton cloth are spread on the pavement and covered with a coating of the grape and starch mixture. When hardened it comes up in sheets, from which pieces are torn and folded carefully into layers with spices, sugar and chopped nuts between. Or halves of walnuts; pistachios or almonds are tied at regular intervals on long strings. These are dipped in the grape-juice and starch, and hung on racks, where they harden and form the Oriental "stick of candy". Into the residue in the pan, cracked wheat and spices are stirred, forming a sweet, sticky cake.

A Westerner does not acquire a taste for these sweets at once, for they seem insipid, but the hot, thick molasses, or the cool "grape butter" are delicious.

Before the war, considerable quantities of these peculiar sweets were shipped to New York, for the consumption of our Oriental population.

Professors C. K. Leith and V. C. Finch, of the Department of Geology and Geography of the University of Wisconsin, have been called to Washington to serve as expert assistants to the U. S. Shipping Board, Professor Leith in connection with minerals and Professor Finch in the capacity of agricultural geographer. Both have leave of absence from the university for the present semester. Professor Walter S. Tower of the Department of Geography of the University of Chicago is acting in a similar capacity.

SUPPLEMENTARY WORK IN THE TEACHING OF GEOGRAPHY*

By E. S. Clem
Bovey, Minn.

DR. CHARLES A. McMURRY has said "Geography is the study of the interaction between man and earth." Professor Dewey has said "The aim in developing a topic in geography should be to picture life responses and to cultivate in the pupil that attitude of mind in which he is on the alert for geographical cause." Professor Salisbury has said "Geography is best adapted to preparation for life in general, for it deals with common things—land, water, air, plants, animals and human beings, with the everyday facts of life."

Since geography is to teach the interaction between man and earth, to cultivate in the pupil the attitude of mind in which he is watchful for geographical cause, and since it deals with the everyday facts, the common things of life, it is very essential that more than a text book be used to teach the subject in the most successful manner.

Supplementary material is necessary. What is supplementary material? It is anything aside from the text book that will aid in gaining knowledge about the interaction of man and earth, that will make the pupil observe geographical causes, or that will assist the child in understanding the everyday facts of life. Hence, it would be too great an undertaking to name all the different kinds of supplementary materials; it is with some of the general types only I wish to deal.

First: Let us consider the kind that is better adapted to the need of the teacher, that will assist her especially in keeping herself fresh in the subject, in order that her pupils may gain knowledge from a running fountain, sparkling with enthusiasm, instead of from the stagnant pool of mental inactivity. This class could be sub-divided as follows:—books, magazines, travel, and attendance at summer schools; books of a pedagogical nature, bearing on the subject, such as "Methods in Geography," "Courses in Geography," etc.

Magazines, such as the Review of Reviews, the World's Work, the Literary Digest and others dealing with current, political, social and industrial events are almost indispensable. Geography is constantly changing; the appreciation of this fact may be

*Abridged from a paper read before the Geography Section of the Northeastern Minnesota Teachers' Association.

gained through the daily papers. The Journal of Geography is about the best inexpensive professional help a teacher can secure.

Travel is a luxury, but exceedingly helpful in the teaching of geography, because first-hand knowledge is better than that gained from books. The teacher whose salary is sufficiently large to enable her to take an occasional trip during vacation will find her value increased accordingly, providing the journey has been planned with a purpose.

Now let us consider the materials which are more closely connected with the pupils' work. Globes and maps are probably the most essential aids to the text. The globe gives a better idea of the relative sizes and positions of oceans, seas, continents and islands than can be obtained in any other way. Globes deal with the earth as a whole, while most maps deal with localities but are necessary in studying sections of the earth's surface.

It is difficult to give young children an understanding of facts not within their field of observation. They are more or less skeptical; and though they may tell you, when questioned, that the earth is round, that does not mean they believe it; they want proof. So when the sunlight comes streaming into the room, do not shut it out until you have made use of it. Place objects in its path and ask the pupils to observe the shapes of the shadows cast by the objects and compare them with the shapes of the objects which cast them. Then a few questions such as these: What is the shape of a shadow cast by a ball? Round? Then what is the shape of the earth if it always casts a round shadow on the moon during an eclipse? An apple, with a knitting needle for an axis, may be used in the sunlight to demonstrate day and night, and to show that night is only the absence of sunlight. By inclining the needles, the cause of the change of seasons may be made clear. A peeled orange may be used to show the convergence of the meridians.

Map Making

The making of maps is helpful in gaining knowledge about any section of country. In studying surface features, relief maps may be made out of coarse salt, flour and water, or *papier mache.* The main thing in map drawing is to be able to sketch quickly the form of a continent, country, state or county and locate most important cities, rivers, lakes, locations noted for various products, arid or rainy belts, and places of densest and least population. A great amount of judgment must be used in map drawing; it must not be either slighted or overdone.

The Department of Interior through the United States Geological Survey has published a selected list of maps, illustrating

physiographic types in different parts of our country. They may be purchased for a small sum per map from the superintendent of Documents, Government Printing Office, Washington, D. C.

The best supplements in teaching land and water forms are lantern slides and stereoscopic views. By the aid of these the world can be brought into the classroom and knowledge can be gained almost first hand. The stereoscopic view is more realistic than the lantern slide as it gives depth of view and the true appearance of perspective.

Pictorial magazines, especially the National Geographic are very helpful. No school library is complete without it. Advertisements of large railroad companies, picturing interesting scenes and places along the route, may be obtained by writing to the General Passenger Agents of the roads. Sometimes they may be secured from the local station agent.

The School World, published by D. H. Knowlton, frequently puts out a number, entirely devoted to the geography of some locality, such as the one on "The Phillipines" or the one on "Japan and the Japanese." Any of the back numbers may be selected and purchased at five cents each. I have purchased many of these little booklets and have used them to good advantage in teaching geography.

Selections of literature may sometimes be used to advantage. Poems and descriptions of natural scenery often contain valuable information. James F. Chamberlain has an interesting article on "Literary Selections as an aid in teaching geography" in the Journal of Geography for September, 1916.

A good reference library is of prime importance in teaching geography. The Encyclopedia covers almost every topic in geography. The "Books of Knowledge" in twenty volumes are highly interesting from a child's point of view. "The Library of Valuable Knowledge" in twenty-five volumes is both useful and interesting to older pupils and teachers.

A class in one school may correspond with children of the same grade in a place of different environment. Their home surroundings will become more interesting when their motive is to make them appear at their best to someone who has never seen them. A boy on the Iron Range of Minnesota may correspond with a farmer's son in Indiana; the irrigated orange groves of California become more interesting to a class who, in return, describe the oyster fisheries of Baltimore. Such correspondence may be carried on by the class, but perhaps more real benefit would be derived by having such pupil write to some child in a different locality.

An excursion to a factory or a field trip is a valuable way of teaching, for seeing is believing to a child. There are two difficulties, namely, the time it requires and the difficulty in maintaining order. Discipline will not be so hard if the teacher has prepared the pupils for what the pupils are to see and if the teacher has been over the ground before.

A laboratory for geography is a luxury few schools can afford, but even without one many valuable experiments may be performed. For instance, in a room where there is a globe, suspended from the ceiling, a thermometer may be fastened to the rope above the globe and then drawn to a point near the ceiling. Another thermometer should be placed on the floor and after fifteen or twenty minutes, the temperatures may be compared to see of warm air does go up and cold air down. This is not the only experiment to demonstrate this fact, but it is interesting to note the difference between the temperature of the floor and ceiling. Another experiment to show why it is colder in winter, with the earth three million miles nearer the sun than in summer, can be made as follows: at noon, on a sunny winter day, place two dark colored pans, filled with loose soil, each having a thermometer about half an inch under the soil; have one pan standing on the level and the other, tilted so that a stick, placed perpendicular to it will cast no shadow in the noonday sun. After an hour examine the thermometer and the one in the tilted pan will be found to register higher, thus proving the direct rays of the sun are more effective than the oblique rays received in winter.

In conclusion it is needless to state that I have not exhausted the subject, but if anything I have said shall help teachers in their work of teaching geography, I shall be satisfied.

Mineral Production of Alaska in 1917 Over $41,000,000

In 1917 Alaska produced minerals valued at $41,760,000. The gold produced in 1917, $15,450,000, of which $9,850,000 was derived from placer mines, was less than that produced in 1916, which was $17,240,000, and is the smallest since 1904.

During the year Alaska also produced silver valued at $1,050,000, coal valued at $300,000, lead valued at $160,000, tin valued at $160,000, antimony valued at $40,000, and tungsten, chromium, petroleum, marble, gypsum, graphite, and platinum valued at $600,000.

During 33 years of mining Alaska has produced more than $391,000,000 in gold, silver, copper, and other minerals. Of this amount $293,000,000 represents the value of the gold, and $88,200,000 that of the copper.

THE WORLD'S SPONGE FISHERIES

A SPONGE is a marine animal of a very low order. In its natural form it resembles a mass of liver covered with a thin skin usually of dark color and perforated by the openings of the canals which ramify throughout the body. The sponge, as we buy it, is only the fibrous skeleton of the animal. The fleshy parts consist of cells with different functions. The larvae of the sponge, hatching from the eggs, flow out through the canals and after a day or two attach themselves to a rock or coral reef. From two to five years are necessary for the sponge to mature from the larvae stage to a marketable size. The sponges also reproduce by means of budding; as this budding increases the colony increases in size.

Sponges are found off the Australian coast, off the coasts of Florida and the Bahama Islands, in the Red Sea, and in the Mediterranean especially in the Adriatic Sea and off the coast of Tunis. The Australian sponges are used only locally. Those from American waters are plentiful but are of coarse varieties. The beds of the Red Sea do not yield large numbers but the quality is superior to that of the American sponges. The finer toilet sponges, Turkish and cup sponges come from the Mediterranean. The fineness and elasticity of these sponges is due to the fact that they are found in deep water, ranging from 150 feet to 200 feet; here there is less disturbance than in shallow water.

In water to the depth of 40 feet the sponges are obtained by the use of long-handled hooks which tear them from their position. In order to find the beds, a "water glass" is used; this consists of a pail with a glass bottom or a hollow iron cylinder with a pane of glass at one end. When submerged this water glass prevents the sight of the fisherman from being disturbed by the reflecting surface of the water. The actual fishing is done in small boats called "dingys." The larger boats are used to transport the small boats to the fishing grounds and to market the catch.

In deeper waters, if the sponges are not very valuable, a dredge is used. This consists of a bag-like net with a wire frame. When dragged along the bottom this dredge tears the sponges loose. Both the hooking and dredging processes are wasteful because so many of the immature sponges are destroyed and because the matured sponges sometimes are torn loose before the larvae have been thrown off. Sponge beds treated in this way are soon depleted.

Our government is trying to find a practical method of increasing the supply through cultivation. Small sponges are at-

tached to cement blocks and lowered into the ocean. Since it takes from 3 to 7 years for these cuttings to mature, the experiments have thus far not been very successful in establishing the practicability of this method.

In the Mediterranean Sea, both because of the greater depth of the beds and because of the greater value of the sponges, professional divers are employed. The divers inflate their lungs to the greatest possible extent before diving. Attached to a rope, they dive into the water holding a marble slab of about 25 pounds in their hands to weight them down. The divers can go only 100 to 240 feet deep on account of the enormous pressure of the water; at 120 feet the pressure is 53 pounds to the square inch; at 240 feet the pressure is 106 pounds per square inch. The unequal pressure within and without the body causes bleeding of the nose and mouth especially at the beginning of the season before the divers have become accustomed to this abnormal condition. Two minutes is the usual length of the diver's stay under water; three and a half minutes is the utmost extent of endurance. After he has gathered the sponges in a bag he jerks the rope and the boat-men pull him up. When he reaches the top, the air rushes into his lungs with a roaring sound and the man usually faints from the sudden change of pressure.

The preparation of the sponges for market is simple. The Florida sponges are not so carefully prepared as those from the Mediterranean. After 12 hours of exposure the sponges are considered killed, after which they are put in pens where the fleshy matter decomposes and is washed out either by the tides or by running water. Then they are dried, bleached in the sun or by chemicals, sorted according to size, strung on cords and sent to ware-houses. Here the bases are clipped off or trimmed, the sponges are sorted according to quality and packed into bales for shipment.

The coarse varieties such as the yellow, velvet, grass, and glove sponges are used by painters, in factories, and for all kinds of rough purposes. Many of the American sponges are shredded and used for the stuffing of cushions; on account of elasticity sponges are especially well suited to this purpose. In normal times the coarsest varieties sell for 20c to $1.50 a pound. Sheeps wool sponges sell for $3.00 to $6.50 a pound. The average output of Florida amounts to about $700,000 annually.

The most expensive are the silk, cup-shaped, and the Manchuka honey-comb sponges which come from the Mediterranean. Cup sponges measuring from seven to eight inches across the top sometimes retail for $15 to $25 a piece. One choice specimen of this size sold for $50.

F. W.

GEOGRAPHICAL ASPECTS OF MESOPOTAMIA*

THE land of Babylonia is not only the gift of the Tigris and of the Euphrates in the past, but it has no life in historical times save for them and their waters. A study of these rivers is therefore not merely important as a background for the history; it is in every sense of the word the very history itself. It is not necessary here to trace their upper courses, but certain facts have a vital effect upon Babylonia. When the Euphrates reaches the alluvium, it has already traversed a distance greater than the total length of most world rivers. It has long ago reached grade. It is far from the snows which fed it, and in the last half of its journey it has received but little water from tributaries. Indeed, it has lost far more than these could add in its progress through a region which during the greater part of the year suffers a torrid heat. So in Babylonia it is an appreciably smaller stream, broad indeed but shallow, lazily moving along its chocolate- colored water and spreading over the fields with the greatest ease the fertilizing silt which it holds in solution. We shall not be surprised to find so many of the earliest cities of the land supplied with water from the Euphrates, even though they did not lie directly on its banks. Its low shores made easy the building of canals leading from it, its slow current reduced danger to their walls to a minimum, and progress was equally possible in either direction. If its heavily laden waters rapidly silted up the canals and made the *corvee* to clean them out the constant fear of the peasant, those same waters furnished a fertilizer without equal.

The Tigris reaches Babylonia after a much shorter journey. What is more, it is never far from a new tributary which brings into it a mass of rushing water from the never far-distant snow hills. Thus it enters the alluvium a mighty stream, narrower but far swifter than its sister river. Though nearly at grade, there is still enough distance to descend to make it move swiftly in a narrow trough, and it is not until well to the south that it spreads out into swamps, and canals become fairly common.

The strongest argument for union in early Babylonia must have been furnished by the rivers. The small rainfall made the land absolutely dependent on the rivers, and these, especially the Euphrates, can be controlled by man without too much difficulty. When the rivers were neglected, as they are so largely today, the result was silted-up canals, pestilential swamps reeking with ma-

*Note—One would not expect to find geographical material in *The American Journal of Semitic Languages and Literatures;* yet the following vivid description is from a paper in Vol. 33 (July 1917) of that journal. It was written by PROF. A. T. OLMSTEAD, now of the University of Illinois.

laria, and a stream whose wanderings could not be foretold. Such a condition we found in 1908, when the Euphrates had left entirely its former bed and had flowed into the canal to the west. The site of Babylon was without a drop of running water, at Hillah a bridge of boats was anchored in the shallow dry bottom, and the palms along the banks were dying for want of moisture. Should such a condition exist for a period of years the country would become a desert.

Human agency has shifted back the course of the errant stream, and it could so do in antiquity. More than once do we hear of damming the river as the most important element in a campaign. For example, we are told, "Abishi, the son of Samsu iluna, to conquer Iluma ilu, his heart moved him to dam the Tigris, and he damned the Tigris, but he caught not Iluma ilu."[1] By shifting the course of the rivers, still more by blocking up the canals, the enemy could destroy communications, cut off the army, and even starve out its opponents. The whole river and canal system pointed to unity, and the surprising thing is that the response to the geographical environment was so slow in being brought about. * * * *

The palms form a long fringe along the rivers and canals or hide the villages, with their shapeless blocks of mud huts and their gardens surrounded by mud walls. The great fields of wheat, barley, millet, and sesame which formerly made vast masses of green have now largely disappeared, and the bare plain stretches to the horizon, broken only by patches of alkali which the rains have brought to the surface, by low mounds which mark the site of ruined cities, and by two parallel embankments where was once a canal. As the heat of the day increases, the mirage begins, and by nine o'clock, even on a winter's day, the shimmering air shows vast beds of water where in reality is only alkali baked soil, seared with huge cracks.

Babylonia has a winter, but a mild one—a few sudden storms of pouring rain, some overcast days, nights when a charcoal fire is welcome, a few when ice forms and in the morning the lines of buried mud brick walls show in the shapeless mounds. With the morning sun the air is delightful, and it is rarely too cool for comfort. Soon, however, the days become hot, and even in February there may be danger of sunstroke. By the beginning of May the last clouds have disappeared, and for seven months there is a reign of terror. The temperature mounts to unbelievable heights, often above 125 degrees. The hardened native shuns the midday sun, and for the stranger it would be suicide.

THREE YEARS OF WAR COMMERCE

IT is now possible to "round up" the figures of United States commerce in the first three years of the war and compare the same with the year immediately preceding the war.

The figures of our commerce as stated by the Government represent fiscal years ending June 30, and as the war began in the early part of August, 1914, we may assume that the trade of the United States in the fiscal years ending June 30, 1915, 1916 and 1917 represent war years, and the figures for the year ending June 30, 1914, represent the year immediately preceding the war.

The first few months of the war, which began in the early part of August, 1914, had comparatively little effect upon our trade, causing in fact a reduction in both imports and exports by reason of the disarrangement of shipping facilities, and ocean rates, and it was not until the latter part of the fiscal year 1915 that the great stimulation in our exports by reason of the war began to be apparent, and this is equally true with reference to imports, which showed a decline in the first few months of the war and only began to show increases in the later months of the year. As a consequence the figures of the fiscal year 1915, of which ten and a half months were actually within the war period, show but small increases when compared with the fiscal year 1914, which was entirely outside the war period. It is in the fiscal years 1916 and 1917 that the marked increases in both imports and exports are apparent.

The import and export figures of the fiscal years 1914, 1915, 1916 and 1917 are as follows:

Fiscal Year	Total Imports	Total Exports
1914	$1,893,926,000	$2,364,579,000
1915	1,674,170,000	2,768,589,000
1916	2,197,884,000	4,333,483,000
1917*	2,633,000,000	6,279,000,000

On the import side the increase has been little more than normal. Total imports in 1916, the third year of the war, were but about 40 per cent greater than in 1913, three years earlier. Even on the export side the increase is not as great as we might expect in view of the enormous increases in certain lines of articles, for the total exports of 1917 are but 166 per cent greater than those of 1914, the year preceding the war. True, in many articles the gain has been enormous, explosives, for example, being in 1917 about $820,000,000 against $6,000,000 in 1914; commercial

* June estimated.

automobiles $41,000,000 against $1,000,000 in 1914; iron and steel manufactures $1,100,000,000 against $251,000,000 in 1914; bread-stuffs $590,000,000 against $165,000,000 in 1914; meat and dairy products $395,000,000 against $146,000,000 in 1914; horses and mules $90,000,000 against $4,000,000 in 1914, and sugar $73,000,000 against less than $2,000,000 in 1914, all these figures by articles for 1917 being based upon official returns for 10 months of the year. For grand divisions, countries and great groups the figures are official for 11 months of the year.

These great increases in certain articles exported, of which much has been said in public discussions, through the press and otherwise, have created an exaggerated opinion as to the increase in total exports of which many important articles have declined. Cotton, for example, exported in 1917 was but about $520,000,000 value against $610,000,000 in 1914, and in many other articles such as lumber, agricultural implements, fertilizers, naval stores, tobacco manufactures and others of very considerable importance, the exportation in 1917 is much less than that of 1914, the year preceding the war, while many non-war materials show less than the normal gain.

A closer view of the effect of the war upon the trade may be had from an examination of the imports and exports by great groups of articles in each year of the war compared with 1914, the year immediately preceding the war. It will be seen from an examination of these that the chief increase in *importations* occurs in manufacturing material, consequent upon the activity of our manufacturers in responding to the demands of the war area. Crude manufacturing material, which includes such articles as hides and skins, India rubber, fibres, wool, cotton, copper in ore, and silk shows the largest increase, the total for 1917 in round numbers being $1,100,000,000 against $633,000,000 in 1914, while partly manufactured material also for use in manufacturing, such as pig tin, pig iron, pig copper, etc., show a total of $465,000,000 against $319,000,000 in 1914; foodstuffs show a much less gain than that of manufacturing material, while finished manufactures show an actual fall off, being in 1917 but $369,000,000 against $449,000,000 in 1914.

On the *export* side the group "Manufacturing Materials" shows an actual decline. The two groups of foodstuffs show, of course, large gains, foodstuffs in a crude condition, chiefly cereals, having been in 1917 $722,000,000 against $137,000,000 in 1914, "foodstuffs partly manufactured," including meats, flour, etc., $734,000,000 against $293,000,000 in 1914.

The greatest gains, however, occur in manufactures. The groups "Manufactures for Further Use in Manufacturing," which

includes pig copper, brass, zinc, lead, iron and steel in a partly manufactured state, and leather, show a total of $1,190,000,000 in 1917 against $374,000,000 in 1914, while "Manufactures Ready for Use," which includes explosives, fire arms, barbed wire, metal working machinery, manufactures of brass including shells, woolen and cotton goods, boots and shoes, cars, locomotives, rails and many other manufactures of iron and steel, show a total for 1917 of $2,935,000,000 against $725,000,000 in 1914, the 1917 figures in all of these statements being based upon eleven months' actual figures and an estimate for the twelfth month of the year. —[*Civics and Commerce.*]

CURRENT MATERIAL FOR THE GEOGRAPHY TEACHER

More Ships Traversing the Panama Canal; Few Slide Troubles

TRAFFIC through the Panama Canal last year increased largely over the previous years, according to the annual report of Col. Chester Harding, governor of the canal. A total of 1,876 vessels of all classes passed through the canal from July 1, 1916, to June 30, 1917, inclusive.

Of these, 905 passed from the Atlantic to the Pacific, and 971 from the Pacific to the Atlantic. In the fiscal year 1915, 1,088 vessels passed through the canal and in 1916, 787. The total number of vessels transiting the canal since it opened for commercial traffic in August, 1914, is 3,751. The total net tonnage, canal measurements, for the several years is as follows: 1915, 3,849,035; 1916, 2,479,762; and 1917, 6,009,358. The cargo tonnage transported was, for 1915, 4,969,792; 1916, 3,140,046; and 1917, 7,229,255.

The traffic for the year yielded a revenue of $5,631,781.66 from tolls. The rules for levying have thus far remained unchanged.

It will be remembered, says the report, that under present law and regulation tolls are based on canal tonnage, at the rate of $1.20 per net ton, except when this product exceeds the registered net tonnage, United States rules, at a rate of $1.25 per ton, in which case the lesser amount is collected. The confusion, lack of uniformity, and loss in revenue to the canal resulting from the present arrangement have been fully discussed in previous reports, and remedial legislation is now pending in Congress.

In this connection, attention is invited to the fact that the revenues from tolls for the past fiscal year would have been

$6,668,247.32 if canal rules alone had governed, which is $1,036,-465.66 more than the amount actually collected.

The year's dredging chargeable to construction, which includes all the excavation in the canal prism at locations where the full widths and depths have not been once obtained is as follows: Gaillard Cut, 183,904 cubic yards; between Gamboa and Pedro Miguel Lock, 246,998 cubic yards; and Pacific entrance, 221,133 cubic yards. At the end of the year there remained 1,409,149 cubic yards of original excavation to be done within the limits of the canal prism.

Cucaracha slide has given no further trouble since the large movement that blocked the canal in August, 1916, as described in the report of last year. To reduce the chances of interruptions to traffic due to future similar movements if they occur, the material in the slide was removed for a distance of 100 feet outside the canal prism.

It is believed that in the future the great slides of the canal will be of historic interest only.

Deducting from the total canal appropriations all appropriations for purposes other than construction, there remains a total of $378,511,853.92 appropriated for the construction of the canal and its immediate adjuncts.

Copper Production for 1917 Exceeds Half Billion Dollars

The production of copper in 1917 was slightly less than in 1916, from all plants that make blister copper from domestic ores or that produce refined copper. At an average price of about 27 cents a pound the output for 1917 has a value of $510,000,000, as against values of $475,000,000 for 1916 and $190,000,000 for 1913.

Arizona produced 687,800,000 pounds, a slight decrease from the production in 1916, which was 694,800,000 pounds.

Montana produced 278,000,000 pounds, as against 352,000,000 pounds in 1916.

Michigan produced 275,000,000 pounds, an increase over the 269,794,000 pounds produced in 1916.

Utah produced 245,000,000 pounds, as compared with 232,-000,000 pounds in 1916.

Nevada produced 110,000,000 pounds, an increase over the 100,800,000 pounds produced in 1916.

Alaska, with a production of about 87,500,000 pounds, showed a large decrease from the previous year.

Iron Ore in 1917

The iron ore mined in the United States in 1917 amounted to about 75,324,000 gross tons, compared with 75,167,672 tons in 1916, an increase of 0.2 per cent. The shipments from the mines in 1917 are valued at $236,178,000, compared with $181,902,277 in 1916, a decrease in quantity of 2.9 per cent, but an increase in value of 29.8 per cent.

About 85 per cent of the ore mined in 1917 came, as usual, from the Lake Superior district, which shipped 64,275,000 tons. The shipments of iron ore by water from the Lake Superior district, amounted in 1917 to 62,498,901 gross tons. It thus appears that the iron-mining industry in the Lake Superior district has been able to bear the strain of the war demand but not to duplicate the great record of ore shipments made by the district in 1916, which amounted to 64,734,198 gross tons. The slight falling off, it is understood, was due to less favorable weather for shipping early and late in the season of 1917 rather than to inability of the Lake fleet to handle the ore mined.

The South mined and shipped more than 8,100,000 tons of iron ore, the bulk of which was produced in the Birmingham district, Ala., but the iron mines of Georgia, Tennessee, North Carolina, and Virginia contributed about 1,400,000 tons to the total.

The Northeastern States—New Jersey, New York, and Pennsylvania—increased their production slightly as compared with 1916 and shipped to blast furnaces approximately 2,446,000 tons of ore. This quantity, however, represented a decrease of 4.1 per cent as compared with the shipments in 1916.

Colorado, New Mexico, and Wyoming, the principal iron ore producing states in the West, are estimated to have mined and shipped approximately 666,000 tons of iron ore, compared with 717,660 tons in 1916, a decrease of 7.2 per cent.

ORGANIZATION OF A TEXAS COUNCIL OF GEOGRAPHY TEACHERS

GEOGRAPHY is beginning to come into her own in Texas. Two important things have recently been accomplished.

In November of 1916, at the State Teachers' Association, a Geography section was created. Up to this time this vital subject had been represented by one paper on the program of the Science section. At the first Geography section meeting, in November of 1917, at least fifty teachers were present and, under

the direction of Chairman E. G. Littlejohn of Galveston, the following program was carried out:

1. Present Status of Geography in Texas
   a. In Colleges and Normal Schools, J. W. Pender, North Texas Normal College.
   b. In Intermediate and High Schools, Miss Emily Kellogg, Waco.
   c. In the Rural Schools, Supt. G. A. Pringle, Marlin.
2. Fundamentals vs. Incidentals, Miss Margaret Hunter, El Paso.
3. Visual Instruction; Its Importance and the Means for Giving It, Miss Lula Parker, Ft. Worth.
4. What the School Library Can Do for the Geography Teacher, Miss Irene Saunders, Galveston.

At the close of the program the work of the National Council was presented, and, after a brief discussion, it was unanimously decided to make of the Geography section a State Council of Geography Teachers. The officers elected for the 1918 meeting form the executive committee of the State Council with the writer as chairman of the membership committee. The officers are as follows:

Supt. E. G. Littlejohn, Galveston, chairman.
Miss Elizabeth Woolworth, San Angelo, secretary-treasurer.
Miss Harriet Smith, Huntsville, chairman membership Com.

ACTIVITIES OF THE MICHIGAN GEOGRAPHY TEACHERS

UNDER the leadership of Professor R. D. Calkins, president of the Michigan Council of Geography Teachers, several promising lines of work are being initiated. A letter outlining proposed activities has been sent to members of the executive committee. The State Teachers' Association has accorded to geography a section in the annual meeting; and the spring meeting of the Council of Geography Teachers will be held jointly with the Geography Conference of the Michigan Schoolmasters Club. Two sessions of this meeting are planned, one to be devoted to Commercial Geography and closely related topics, and the other to a report on the status of geography in Michigan high schools.

The state has been divided into four sections, each under the leadership of prominent geographers. A campaign for members of the Council is under way.

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MONTANA

By Grant E. Finch

Montana State Normal College, Dillon

BOUNDARIES and Size. Montana is the northernmost of the tier of Rocky Mountain states, touching Canada on the north and Wyoming on the south. It lies between North Dakota and a part of South Dakota on the east and the narrow northern arm of Idaho on the west. It is the third largest of the states (area, about 147,000 square miles), ranking next in size after Texas and California. Its shape is that of a parallelogram, irregular in boundary on the southwest, measuring 550 miles from east to west, and 275 miles from north to south. It is larger than all the New England states, together with New York, New Jersey, Delaware, and Maryland. The distance by rail across the state on one of the transcontinental lines is over 750 miles, or about as far as from Chicago to Philadelphia.

Mountains. Although Montana is a mountain state its eastern end extends far out into the Great Plains, so far that the traveler entering the state from the east has hundreds of miles to travel before he sees a mountain. There are a few scattering mountain ranges east of the middle line of the state and more numerous ranges on to the west, while the western third of the state is all mountainous. The main range of the Rockies crosses the greater portion of the state, well to the west; its general trend is northwest-southeast. It passes west of Helena and east of Butte. South of Butte it bends westward to the Idaho line and forms the Montana-Idaho boundary as far as Yellowstone Park. This range, known as the Continental Divide, separates Montana into two parts, the Pacific slope on the west and the Atlantic on the east, the latter being much the larger. A portion of Glacier National Park on the northern boundary drains into Hudson Bay. One high ridge in this Park is known as the "Triple Continental Divide." Montana is the only state in the Union which drains into three oceans.

The mountain ranges are numerous, probably fifty or more. They have in general a trend parallel to the main continental backbone. Among the ranges to the west of the Rockies are the Flathead mountains, the Mission Range—one of the most beau-

tiful in the state—and the Purcell, the Kootenai, the Coeur d'Alene and the Bitterroot ranges. East of the Main Range are, first, the Big Belt, Bridger, Madison and Gallatin ranges; beyond these, the Little Belt, Crazy and Absaroka mountains, and scattering ranges still beyond these. The highest peaks in the state are found in the Beartooth mountains on the southern boundary line, Granite Peak, 13,000 feet high, being the loftiest, and numerous others exceeding 12,000 feet in height. There are no elevated

Fig. 1. Emigrant Peak, Absaroka Range, and Yellowstone River. Courtesy Northern Pacific Railroad.

plateaus of any magnitude and the average elevation of the state is much lower than that of the states to the south (Montana, 3,900 ft.; Colorado, 7,000 ft.) The low points of the eastern and western boundaries are in the neighborhood of 2,000 feet and the railroads cross the continental divide at altitudes of from 5,200 feet to 6,300 feet.

Lakes. Most of the numerous lakes are of the small but beautiful Alpine type, though Flathead Lake, west of the Divide in northern Montana, is an exception, being 32 miles in length, the largest lake in the state. Ponds are numerous in some sections of the plains, particularly in the glaciated portion of northern Montana.

The non-mountainous part of Montana is a great plain which comprises more than one-half the total area. At the north the plains are fairly level where the Keewatin ice sheet smoothed

their surface. In the central and southern portions the plains are more rolling, with high divides, separating the drainage areas, which are sometimes deeply trenched and much dissected. In various parts, principally to the east, there are "bad land" sections whose extremely rugged topography is due to the rapid and uneven erosion of the soft underlying Tertiary and Cretaceous rocks.

Rivers. More than two-thirds of the state is drained by the Missouri and its tributaries. This stream heads at Three Forks, being formed by the union of the Gallatin, the Madison, and the Jefferson, whose fountain heads are in Yellowstone Park and in the mountain lakes and springs of the Continental Divide west of the Park. At Three Forks the Big Muddy is a clear mountain stream. It first flows northward between mountain ranges; north of Helena it passes through the "Gates of the Mountains," a gorge cut through the Big Belt Range, and emerges on the plains. Continuing its northerly course to Great Falls, it then turns sharply to the east and in seven miles drops by a series of falls and cascades a distance of 535 feet, and flows on eastwardly across the state in a deep and narrow valley. Its principal northern tributaries are the Sun, Marias, and Milk rivers. From the south it receives the Smith, Judith, and Musselshell rivers, and the largest of all its Montana tributaries, the Yellowstone. The Yellowstone rises in Yellowstone National Park and flows north and east for hundreds of miles, finally joining the Missouri a few miles over the state line. Important tributaries of the Yellowstone are the Clark's Fork, the Big Horn, and Powder rivers, all from the south.

The principal streams of the Pacific slope are Clark Fork (there are two rivers in the state bearing this name) and the Kootenai. Clark Fork rises above Butte and flows northwest ultimately to join the Columbia. It has numerous local names in its course in Montana—Yankee Doodle Creek, Silver Bow Creek, Deer Lodge, Hell Gate, Missoula and Clark Fork river—so that the decision of the Geographic Board that it be called Clark Fork throughout its length appears to be well founded. Its chief tributaries are the Bitterroot from the south, and the Flathead from the north. The Kootenai flows irregularly across the northwestern corner of Montana. It is a clear, beautiful stream with gravelly banks and a timbered valley. Both the Kootenai and Clark Fork have a greater minimum flow than the Missouri.

Fort Benton is marked on the maps as the head of navigation on the Missouri and in early days it was visited every season by numerous boats from St. Louis. Even the Yellowstone was once deemed a navigable stream. Now the only event in river naviga-

tion in the state is the annual pilgrimage of the Government "snag boat" up the Missouri.

The climate of Montana is characterized by the long winters and short summers due to its latitude (45 to 49 deg.) and its distance from the ocean. Shut off from the moisture-bearing winds of the Pacific by numerous mountain ranges and lying west of the path of the winds from the Gulf of Mexico, its rainfall is light and its percentage of sunshiny days large. It has an average annual rainfall of over 15 inches and an average crop-growing season of about 120 days. The state shows marked regional variations in its climate. Eastern Montana has the extreme of winter cold and summer heat of North Dakota while western Montana has the lower seasonal range of temperature of eastern Washington and northern Idaho. Northwestern Montana has the heaviest rainfall of any section of the state. Local variations in rainfall are very common. The mountain ranges, particularly their western slopes, have a good rainfall and even the benches along the mountain valleys and the high divides of the plains have more rain than the lower lands adjoining. An accurate rainfall map of the state would be as varied as the topography. The marked effect of altitude on climate, both temperature and precipitation, is not readily appreciated by dwellers in the prairies of the central United States.

Forests. About one-third of Montana is forested, the forests being confined to the regions of heaviest rainfall. Sections of northwestern Montana are continuously forested; elsewhere there is much open forest. Many mountain areas (lofty peaks and rocky or south-facing slopes) and many mountain valleys are devoid of forest growth, although lying within the forest regions. The plains are treeless except for fringes of willows and cottonwoods along the streams and dwarfed evergreens on some of the high divides. Coniferous species—pine, spruces, fir, and larch—make up the bulk of the forests.

More than one-half of the forests are included in the United States National Forests. Under control of the Forest Service important watersheds are preserved from denudation. Cutting is permitted only so far as it may be equalled by natural growth and deforested areas are replanted. A patrol system, aided by lookout stations, roads, paths, fire lanes and telephone lines, keeps down the fire waste.

Mines. The exploitation of the state was begun by the notable expedition of Lewis and Clark in 1805-07. It was very effectively continued by the fur traders and trappers who came immediately after Lewis and Clark. The gold seekers who thronged here in

the late fifties and early sixties completed the exploration of the state, and with their great discoveries of gold at Bannack (1862), Alder Gulch (1863), and Helena (Last Chance Gulch, 1864) the settlement and development of the state began. Montana began as a mining state and mining has always been one of its principal industries. Over $2,000,000,000 has been produced by its mines since they began to yield and the total mining output in 1916 was $145,000,000.

Fig. 2. Fire Lookout Station on Mountain Top, Western Montana. Photo by United States Forest Service.

The first mines were the placer "diggings," with their various systems of washing the loose gold from the gravel bars along the streams. The next step was the development of quartz—or deep-mining and then the production of silver was added to that of gold. The development of copper mining came with the building into the mining districts of the Northern Pacific railroad from the east and the Utah and Northern (now the Oregon Short Line) from the south.

Though the mining output of Madison, Lewis and Clark, and Jefferson counties and of Philipsburg and other mining districts

is important, the production of the Butte mines has for years overshadowed all other mining in the state. Within the environs of Butte is a high hill of eruptive granite, Anaconda Hill, which is known in Montana as the "richest hill on earth." The mineral veins of this hill attain in places a thickness of two or three hundred feet and through "secondary enrichment" a workable thickness of six hundred feet has been reached. Many of the veins have been followed down to a depth of over 3,000 feet without signs of exhaustion. About 15,000 miners find employment in the Butte mines, making Butte a city of over 70,000 people, the first in size in the state. The location of the Washoe smelter on Warm Spring Creek, 29 miles west of Butte, is responsible for the existence of the city of Anaconda, now a place of over 15,000 people. The Butte ores are also shipped to Great Falls, 150 miles away, for smelting, and the industry has had much to do with the growth of that city.

In the past few years the production of zinc has made great advancement, the output for 1916 being valued at $31,000,000. For years Montana ranked first in the production of copper but recently she has had to yield first place to Arizona. In 1916 she ranked first in the production of silver.

In addition to metal mining the mining of coal is also an industry of much importance. Coal beds are very widely distributed over the plains portion of Montana, their total area being placed by some authorities as high as 30,000 square miles. In the Tertiary formations of eastern and northern Montana there are thousands of square miles of lignite beds, usually lying at the surface or so close to it that the residents of each locality are able to dig their own fuel from the ground. Both semi-bituminous and bituminous coals of high grade are found in the Cretaceous coal beds of central Montana. The principal producing mines are those of the Red Lodge district of southern Montana and of Roundup and Lehigh in central Montana. In 1917 the total coal production was about 4,500,000 tons.

Grazing. Montana has for years held high rank as a grazing state. The native grasses are abundant and highly nutritious. These grasses cure on the ground, so that stock thrive on them the year around. Stock animals in the ordinary winters of light snows and frequent chinook winds are able to "rustle" on the range without feeding, but the percentage of losses is so high in case of severe winter storms that stockmen have generally taken to providing hay for their animals to be fed as needed. Cattle are even fattened for market in winter on hay alone, as in the Big Hole Basin in western Montana for example. While the raising of

horses and cattle is an important industry, it is as a sheep state that Montana takes highest rank. Sheep are better fitted to graze on the rugged lands and regions of scanty vegetation than are cattle, also better able to graze beneath the snow in winter. The favoring climate produces fleeces of good weight and high quality. The total number of sheep in the state is in the neighborhood of 4,000,000, giving Montana, next to Wyoming, first place in this industry.

Fig. 3. Sheep Grazing on Forest Reserve. Photo by U. S. Forest Service.

The stockmen have in recent years suffered the loss of much of the open range land whose free use was so advantageous to them. However there yet remain millions of acres of land either too rugged or dry or inaccessible for farming purposes but still valuable for grazing, and in addition the seventeen million acres of Forest Reserves afford excellent summer range.

Agriculture. Farming by irrigation began at an early day in Montana in the mountain valleys near the mining camps with their excellent markets. With the coming of the railroads all the valleys which were susceptible of irrigation were farmed. As wealth increased capital became available for the construction of "high line" ditches to reach the fertile benches above the valleys. State and nation began to assist in projects—Carey Act and Reclamation Service—to bring the water to extensive tracts in cases where the initial expense was too great for private enter-

prise. The result of all these activities is the intensive farming of several million acres of highly productive land.

The total amount of irrigated land is so small (about 3,000,000 acres) that without other farming the industry of agriculture has seemed destined to remain a minor one in the state. In recent years, however, it has been found that crops can be grown without irrigation in many sections, thus greatly increasing the farming area and production. In some localities crops are thus grown every year; in others a crop is grown once in two years, the moisture being conserved in the soil in the alternate years through surface cultivation. Excellent results in this so-called "dry-farming" have been attained in many localities, such as the Judith Basin, Belt Basin, East Gallatin Bench, and Lake Basin in central Montana, Tobacco Plains in northwestern Montana and in the extreme eastern counties. Stimulated by these successes 35 million acres of land, more than one-third the area of the state, have been homesteaded for agricultural purposes during the past ten years, and one of the new counties reports 87 per cent of its surface under the plow. It is not to be expected that all the "dry farmers" will succeed. In sections where the factors of local variations in rainfall and evaporation or the capacity of the soil for retaining moisture are against them, the undertaking is a precarious one unless the homesteaders are possessed of sufficient means to tide over seasons of crop failure. Through the addition of dry farming production to that by irrigation the rank of Montana as an agricultural state has been raised from a place near the foot of the states to a rank above the middle.

The principal crops grown are the grains—wheat, oats, barley, rye and flax; hay—alfalfa, timothy, wild grasses; and potatoes, sugar beets and other vegetables. Corn is not grown to any extent, although a successful beginning in its production has been made in the Lower Yellowstone valley. Such fruits as apples, plums, and berries are successfully grown in the Bitterroot valley, the Flathead country and the Billings district.

The manufacturing industries of Montana are in the undeveloped stage common to the newer states. The sparseness of the population, the great opportunities for the laborer in other industries, the lack of nearby markets and of transportation facilities are some of the hindering causes. However the amount of manufacturing in some lines is by no means negligible. The reduction of ores provides employment for thousands of men at Anaconda, Great Falls, East Helena, and Butte. The manufacture of lumber is an important industry in western Montana, the annual output of the mills being over 400,000,000 feet. Flour mill-

ing has become important since the advent of the dry farmer, mills being in operation at Great Falls, Lewiston, Bozeman, and other points in the grain growing section. There are large beet sugar factories at Billings and Missoula. Manufactures of brick and other clay products are in operation at Great Falls, Lewistown, Helena, and Anaconda, and Portland cement manufactures at Trident and Lewistown.

Water Power. The rapid development of the abundant hydro-electric power is noteworthy. About 300,000 horse power has already been developed and new plants are being added at short intervals. The great centers of this development are at Great Falls and along the course of the Missouri through the Big Belt mountains between Great Falls and Helena. There are also large plants at Thompson Falls on Clark Fork and on the upper Madison river. The electric current is in extensive use throughout most of the state in domestic service and in mining, smelting, and other manufacturing, and in transportation. The main line of the Chicago, Milwaukee and St. Paul is operated electrically from Harlowton in central Montana westward across the state and on into Washington, a distance of about 450 miles.

The People. The population of Montana is a transplanted one which comes from almost all the other states. Only one out of three Montanans is native born. Numerous pioneers are yet living who came with the first gold stampede. About 25 per cent are foreign born. Notwithstanding the newness of the state its people show strongly marked characteristics, bred of their environment and fixed upon the inhabitants during the early days of mining and ranching. Among these distinctive characteristics are generosity and sociability. The penny has not yet come into general circulation and the people pride themselves on their indifference to paying high wages and high prices. The bricklayer gets $9.00 and the hodcarrier $5.50 for an eight-hour day. The long distances between ranches and between towns accounts for the sociability. Montanans are progressive, carrying out expensive schemes of improvement in less time than older and more conservative communities would take in considering how to make a beginning. Prosperity is on every hand. The wealth produced in 1916 from the mines, ranches, farms, and forests totalled $342,000,000, an average of $454 for each inhabitant of the state. The chief exceptions to the rule of prosperity are to be found among such homesteaders as have entered on their undertakings without means or experience or judgment.

Montanans travel much and are well versed in conditions in other communities and other states. There is much shifting from

the ranch to town and back again and the orders of society are in a fluid condition with democracy everywhere the rule. There are no cities of 100,000, six of over 10,000 and five between 5,000 and 10,000, so that conditions are for the most part rural.

There is little of the "wild and woolly" as depicted in the West of the movies. Gambling went out several years ago, the red-light establishments more recently, and the saloons are to go the first of January, 1919. The former activities of the picturesque cowboy have been greatly limited by barbed wire and plow, and sheepherding has lost much of its former loneliness. The honk of the automobile has supplanted the crack of the freighter's whip and though not so conservative Montana is fast becoming as regular in its habits as the average Eastern state.

Conclusion. The varied character of the resources of Montana is exceptional. Instead of being exclusively a mining state or a stockraising state or a farming state, Montana is prominent in all three and in addition has numerous other valuable resources, such as coal, timber and water power. The rapid growth in population is in keeping with the wealth of resources. Careful estimates place the present population at three quarters of a million, or double the population in 1910. For several years past the homestead entries (15,000-20,000 annually) have exceeded those of all other states combined, yet there are still large tracts unsurveyed. To the student of geography the appreciation of the natural resources of such a state and the observation of their development constitute a most interesting study.

The Highest Railroads in the World

It is a remarkable fact that among the railroads of the world constructed in part at very high levels above the sea, the eight which have to their credit the absolutely top figures are all situated in South America.

We append in tabulated form the highest altitude of each, the country in which situated and the name of the railroad.

15,865 ft.	Peru	Peruvian Central (Oroya)
15,814 ft.	Bolivia	Bolivia R. R. (Potosi)
15,809 ft.	Chile	Antofagasta & Bolivia R. R.
14,688 ft.	Peru	Peruvian Southern R. R.
14,108 ft.	Bolivia	Arica—La Paz R. R.
13,393 ft.	Bolivia	Guaqui—La Paz R. R.
12,000 ft.	Argentina	Transandine (Arg. Gov.) R. R.
11,841 ft.	Ecuador	Guayaquil & Quito R. R.

THE WEATHER FACTOR IN THE GREAT WAR: VIII*
AUTUMN, 1917, AND WINTER, 1917-18

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The Western Front

GEN. HAIG'S report on the operations of 1917 contains the following significant passages regarding the late summer and fall conditions:—"The Flanders offensive was maintained for three and a half months under most adverse conditions. The weather entailed almost superhuman exertions on the part of the troops of all arms. Despite the magnitude of his efforts, it was the immense natural difficulties, accentuated by abnormally wet weather rather than the enemy's resistance, which limited our progress. What was actually accomplished under such adverse conditions is the most conclusive proof that, given a normally fine August, the capture of the whole ridge in a few weeks was well within the power of our men. They advanced every time with absolute confidence in their power to overcome the enemy, even though sometimes they had to struggle through mud waist-deep to reach him."

It is almost impossible to imagine the difficulties of active military operations in a country covered with water-filled shell-holes; lashed by stormy gales; a slough of deep, sticky mud. The men stumbled forward, in the dark, and rain, and cold; struggling around or through shell-holes; floundering up to their knees, or deeper, in the mud; worn out with the physical strain; many drowning on the march, but advancing to do their duty. As Mr. Philip Gibbs expressed it in one of his graphic letters to the *New York Times*, "The victory is not to be counted so much in numbers of prisoners or in yards of slime as in the spirit of the humble men who worked with all their heart to the last beat against great obstacles and in very foul and cruel conditions. They won through, and that was the great victory." The stretcher-bearers who never faltered; the men who toiled against almost impossible odds to move the artillery forward; the aviators who flew under conditions formerly regarded as prohibitive—all shared in the glory. Many times military operations had to come to a standstill because of the weather. Military authorities acknowledged that the measure of British and French success was

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The present article concludes the series in this *Journal*.

almost wholly a question of weather. Progress was slow. The consolidation of positions gained was very difficult. Even the protection afforded by trenches was often unattainable because of the water-logged ground. The enemy clearly benefited by the bad weather. It was his best protection. In these trying fall months, every spell of good weather was taken advantage of to the utmost. The aviators, flying higher and having better visibility, were able more effectively to direct the artillery fire, and to drop their bombs with greater accuracy, while the drier ground made the movement of troops easier. On Oct. 7 the first snow of the season fell on the frontier heights of the Vosges, and "a cold wave" was moving over France.

The sudden and unexpected British "tank drive" on Nov. 20, in the Cambrai sector, was clearly planned to come during a spell of fine and dry, although cloudy, weather, which favored preparations for the attack. "It was ideal going for the tanks." A fog, combined with the smoke barrage, made observation practically impossible for the enemy aviators. As was to be expected during the changeable fall weather, this dry spell was almost immediately followed by heavy rains, snow flurries, and high winds—the usual autumn storms. Increasing cold, and biting winds, caused suffering to both men and horses, unprotected on the open lowlands. During the British withdrawal on Dec. 6, following the German counterattack, a fog provided protection. It was natural that this "drive," at an unfavorable season, should have led to renewed predictions that the campaign would be continued throughout the winter, and to the hope that the coast would be reached by spring. It was, however, not surprising to find these optimistic views of a continued Allied winter offensive, expressed at the end of November, soon giving way to the conviction that "the coming of winter will probably preclude any further considerable operations on the western front." As Mr. F. H. Simonds expressed it in December, "the interruption of winter makes it possible that the Germans may hold their present lines till Spring." The advance of winter brought more frequent and heavy snows with increasing cold. Despatches of Dec. 29 mentioned snows throughout France, as far south as Toulon, especially in the Vosges. Railway communication and motor transport were interfered with at intervals. On Jan. 11 a despatch noted: "This is the 26th consecutive day of frost and snow. The front is ice-bound. In the trenches every man not needed at the loopholes is under cover." Severe winter weather continued well along through January, interrupted by milder spells, which melted snow and thawed the ground.

The probable date of the expected German offensive was a matter of momentous interest. The Verdun drive was begun in late February, at a season meteorologically unfavorable, in order to forestall the expected British and Russian spring drives. Germany was severely handicapped by the weather. No real "winter campaigns" have been carried on in the western war zone. As a whole, the season of aggressive major operations has been April to November. Having in mind the general character of the weather of the western front, and knowing what part these conditions have played in the present war, it seems, at this writing, unlikely that the Germans will begin their drive until March or April, unless forced to it by the need of silencing popular discontent at home, or by some other political or strategic reason. Spells of warm, thawing weather come with increasing frequency in February and March, but unless the season is early, major operations are likely to be held up by storms and bad roads until spring is well established. The reports during February, 1918, mention fogs, heavy rains, and bad roads, but the increasing numbers of fine days, accompanied by drying ground, caused the Allied commanders to expect the German offensive earlier than had been originally anticipated.

The Eastern Front

The capture of Riga, serious as it seemed at the time, caused needless alarm regarding a possible advance toward Petrograd. It was never likely that the Germans would attempt such an expedition at a season when rains and bad roads, and later ice and snow, would certainly make such a movement difficult, if not impossible. Further, the coming on of winter, with the difficulties of navigation due to ice in the Gulfs of Riga and of Finland, made the possession of naval bases there by the Germans much less immediately serious, from a military standpoint, than many people supposed, and made any attempt on the part of the Germans to move farther east unlikely. It was probably the approach of winter, and not till later the political conditions in Russia, which made it possible for the Germans, even before the complete collapse of Russia, to transfer large bodies of troops from the eastern to the western front.

The German advance into Russia, following the failure of the peace negotiations, after the middle of February, brought up again the question of how far the Teutonic armies would penetrate into Russia at an unfavorable season. Mention was made (Feb. 24) of marches through snows. In view of the known climatic difficulties of snows, rains, and mud, the advance of the

Germans was likely to be difficult if the weather conditions were those of the usual February, March and April.

The Austro-Italian Front

Two phases of the war in this zone during the fall and early winter of 1917 need brief consideration: the remarkable Italian advance in September and most of October on the Isonzo front, and the Teutonic offensive, beginning in late October, 1917, which brought the invading armies well down onto the northern Italian plains.

Gen. Cadorna evidently pushed his troops to the utmost in the Carso Plateau region, in order to smash the Austrian armies, and to gain as much territory as possible before winter should make large-scale operations impossible. There were signs, also, that Italy was preparing for a winter campaign against Trieste when operations farther north could no longer be carried on. There were two classes of difficulties, both directly or indirectly meteorological, which added greatly to the already seemingly impossible task of the Italian troops. One of these was the problem of supplying water to the men who were fighting on the dry plateaus and on the high mountain slopes. Until pipelines could be laid, water was carried up, in small quantities, on the backs of men to the thirsty soldiers who could often look down thousands of feet onto the rivers running in flood far below them. The other difficulty was the stormy autumn weather. Heavy rains changed peaceful streams into raging torrents. Fogs and mists interfered with visibility. Increasing cold added to the discomfort and suffering.

The Austro-German advance began in the last week of October. The Italian front lines were broken through (Oct. 24th) "in a drenching rain and mist, under the most depressing conditions," which rendered the Italian barrage ineffective in opposing the onslaught. As one correspondent put it, "Austria is hiding behind the skirts of autumn." The Italian mountain positions "were surrounded and made untenable before the fog lifted." The use of deadly gases was favored by a light wind and the damp air. Several days of stormy weather were followed by a fine spell, which favored a rapid advance on the part of the Teutonic troops, across the mountains and through the valleys. During the early stages of their retreat, the Italians suffered greatly from cold torrential rains. Much interest centers in the stages of the Italian rivers. When these were running at flood, they served as obstacles to the advance of troops. When their waters were shallow, they could easily be crossed. The reports are con-

tradictory regarding the effect which the varying water-stages in these Italian rivers had upon the movements of the two armies. Sometimes the water conditions favored the invaders; sometimes they helped the Italians. It is clear that the high and low water stages have been a fluctuating factor in the military operations on their banks. The Piave was reported as flowing with a full head of water in mid-November. The rains which caused this high water helped to flood the lowlands. The sector of the lower Piave was further rendered more difficult to cross by the release, by the Italian engineers, of the flood waters through the opening of the dikes. A considerable area to the northward of Venice was thus submerged several feet. On Dec. 13 (1917) a report noted the occurrence of "downpours" for two days, filling the Piave, which had nearly run dry, and effectively flooding the inundated section over which the waters had fallen from 5 ft. to 1 ft. Taking advantage of this low water, the Austrians had made an advance.

After the remarkable Teutonic offensive, which brought the German-Austrian troops down onto the northern plains of Italy, and for a time seriously threatened Venice, military operations were suddenly and most aggressively renewed in the Trentino Alps. The enemy made desperate attempts to capture the mountain positions and to penetrate onto the lowlands, in order to turn the Italian left flank and make the Piave line untenable before winter should make such a task impossible because of snow blockades in the mountains. On the lowlands, the winter would not have interfered with an active Teutonic offensive. The Teutonic advance began "in driving snow, and cold, and pouring rain" (2d week of Nov. 1917). Bitter cold; lack of shelter owing to the terrific artillery action and the constant shifting of positions; insufficient supplies of water; the use of caverns and caves "from which hung huge icicles"; drifting snow; soldiers "compelled to remain for a long time motionless lest they should be discovered by the enemy against the whiteness of the snow"; biting winds—these are conditions mentioned in the official and other despatches. That the coming on of winter at once, and in earnest, with intense cold and deep snows, and raging "blizzards," and avalanches, would have been the best possible ally to the Italians, was well recognized by the military commanders. For in normal winter weather the Teutonic lines of communication both by railroad down the valley of the Brenta, and by the narrow mountain roads, would be paralyzed, or at least badly blocked; the transport of heavy artillery, of munitions and of supplies would be difficult or impossible. Each additional day that the Italians were able to delay the advance of the Austro-German

armies, brought winter's help one day nearer. Each day made the Teutonic offensive more difficult. It is easy to understand why the enemy general staff was ready to make such continuous and desperate attempts to break through before the worst of winter weather came on. They were fighting against time. The early part of the present winter (1917-18) was unusually favorable to the enemy. It was cold, but usually clear, and heavy snowstorms were entirely lacking. The snow, instead of being several feet (5-10) deep in the mountains, as it was a year ago as early as November, was up to about January 1, 1918, only a few inches deep in most places. A despatch of Dec. 6 said that one deep snowfall "would be worth divisions to the Italians." Gen. Diaz said on Dec. 9, "with normal winter conditions prevailing in the north, the enemy would now be in the grip of impassable snows." Several times the occurrence of light snowfalls was noted in the despatches, but the long hoped for heavy snows did not come. Small wonder is it that the Italians prayed for snow in the mountains, and for an end of what they termed "Austrian weather" which they felt had lasted ever since the first day of the retreat from the Isonzo front. It is natural that man should overestimate, or underestimate, the extent of meteorological conditions which are helping or hindering him in warfare. The deficiency of snowfall on the Alpine front during the early part of the present winter is, however, an established fact. Upon this point we have the statement of the major in charge of the meteorological work of the Italian High Command, as reported under date of Dec. 25, 1917, "This is one of the mildest winters we ever had."

The new year, however, brought an almost immediate turn for the better, for on the very last of December and continuing at intervals into January, heavy snows were reported as falling all along the mountain front. The depth of the snow soon reached several feet throughout the area, especially in the mountain passes and narrow valleys, where it drifted badly. The Austro-German troops were at once held up; food convoys stalled and trains from Trent, the great military supply depot in the Adige Valley, blockaded. These belated snows brought a new courage to the Allied troops, for the hope of the Teutonic invaders, of breaking through onto the plains, seemed to be definitely defeated, at least for the remainder of the winter. On Jan. 13, it was stated: "The Italian situation seems to present no cause for alarm." Transport is always difficult in the mountains, even under the most favorable weather conditions, but with roads and passes deep in snow, and in storms and blizzards, the task is often impossible. Thousands of soldiers in both armies were put to

work clearing away the snow so as to permit the steady movement of supplies. Huge tractor snowplows were used, and sledges replaced trucks for carrying food and munitions. The Stelvio Pass, through which goes the principal route to Trent, was blocked by 10 to 15 feet of snow. Farther east, also, the snows made trouble by blocking railway lines and passes, and causing avalanches. Large-scale operations were out of the question while the enemy's communications were snowbound. Severe winter weather also prevented military activity. The Italians had difficulties themselves, owing to the snows and the bad weather, but their enemies were far worse off. The enemy supplies had to be carried over high mountains, almost impassable, and the Italian batteries kept the roads, troops and transports in the rear of the enemy under continuous fire. By the middle of January, the invaders were in a very serious position, their communications having been "almost entirely cut off." Teutonic offensive operations in the mountains on any large scale were out of the question, and starvation stared the enemy in the face. In fact, shortly after the middle of January, the Austro-Germans retired on a section of their front between the Brenta and Piave Rivers. This retirement was doubtless due in part to a recent successful French attack, and in part to the difficulty of maintaining a continuous flow of supplies for the troops because of the deep snows. The Italians were in a much better situation, as their railroad supply lines come across the plains, where snows are light. Hence they were able to take advantage of the enemy's precarious position, and regained certain important "key positions" to the east of the Asiago Plateau. This winter offensive on the part of the Italians was carried out under great difficulties because of the deep snows.

The Balkan War Zone

From the Balkans there has been practically nothing of interest. Mention was made of the heat in Roumania early in September and early in October (1st) there were reports of the cessation of operations in Macedonia on account of the heat. On Sept. 25, the enemy released gas clouds, but a change in wind drove the gas back into their own lines. The first report of snow came Dec. 4, when it was noted as falling "abundantly" in the region of Monastir.

The Caucasus War Zone

Only one report has come of meterological conditions in the Caucasus region. This was under date of Sept. 20, and referred to four feet of snow in the mountains, where a battle was in pro-

gress between Russians and Kurds, at temperatures "below freezing."

The Campaign in Mesopotamia and in Palestine

Bagdad fell early in March, 1917. There was no fighting of major importance after April, owing to the intense heat of summer; to the collapse of Russian co-operation, and to the British campaign in Palestine. Reports have still been coming in of the sufferings of the British during the Kut campaign. One English officer wrote:—"Nothing that has been printed about the hardships of that ill-fated expedition came up to the conditions the men had to contend with. The water was thick with mud and unfit to drink, but it was impossible to keep some of the men from slacking their thirst, which resulted in their death by cholera. When I was down with fever the heat in my tent was 117 degrees, and there was nothing to eat but stodgy porridge. No medicines or medical comforts of any kind . . . . For hundreds of miles there was not a blade of grass, and no chance to get cover from the scorching sun or the enemy's guns. Flies gave us the most trouble in Mesopotamia, where they are worse than in any part of the eastern countries . . . . One fly out of every twenty appeared to be able to bite and inflict a severe sting."

One despatch mentioned the deaths of many British officers and men who, having surrendered to the Turks at Kut-el-Amara (April, 1916), were taken into the interior. The change from the intense heat of the Mesopotamia plains to the cold of a higher altitude, farther north, must surely have caused great suffering.

In Palestine, the British advanced rapidly as soon as the hot, dry summer was over. The capture of Gaza, of Beersheba, and of other less important towns, came during the autumn, when the weather is good for campaigning, being cooler than in summer, and not yet rainy. Gen. Allenby evidently planned to take Jerusalem before the December rains set in. At the end of November the official reports mention "heavy rains" and bright, cold weather. Jerusalem fell early in December. In regard to the capture of that city a correspondent reported:—"A torrential rain made the roads impassable while a chilly east wind pierced the sodden soldiers to the bone. The problems of supply and transport almost drove us to despair. The camels were unable to keep a foothold on the slippery paths. Nevertheless, the food and ammunition supply was maintained fully."

The capture of the Holy City meant much to the British. It meant a very strong line of positions gained. It meant an unlim-

ited supply of water. It brought the conviction that the backbone of Turkish opposition was broken.

On Jan. 2, 1918, Gen, F. B. Maurice said, regarding the situation in Palestine,—"A word of caution is necessary relative to the hopes of an immediate further advance in Palestine. The hills of Judea are notoriously difficult, the weather is unfavorable, and the roads impossible owing to the wet season. The transport problem, therefore, is likely to prevent any considerable movement there for some time." Nevertheless, the British advance continued. In spite of "heavy rainstorms, "mist,'' and "bad weather," the British moved eastward and on Feb. 21 captured Jericho. The rains made the hills "comparable only to masses of slippery soap."

The War in the Air

In so far as the ordinary airplane activity is concerned, it is clear, as has before been noted, that what, at the beginning of the war, were considered weather conditions too unfavorable for flying, now no longer act as a deterrent, although they render the task of the aviators infinitely harder. Flying is just as difficult as ever in gales, in low clouds, and in heavy rain, but flying is done then. We read, e. g., (Oct. 9) "In the stormy weather of these two days air work has been exceptionally difficult and perilous, but the French aviators carried out as far as it was humanly possible, and with the utmost gallantry, their essential tasks." Inability to take photographs of the progress of the artillery preparation is one of the serious handicaps due to fog, low-lying clouds, squally winds and rain. During the British offensive in the Cambrai sector, late in November, particularly good airplane work was done under unusually difficult weather conditions, especially in gales, and under low clouds, when the aviators had to fly very near the ground. Spells of fine weather were always accompanied by increased activity in the air. On the Italian front a fleet of enemy airplanes took advantage of a hazy spell (Dec. 27) for an attack over Treviso.

As regards the use of Zeppelins, it has been stated, on good authority, that "the superdirigible may now be considered practically weather-proof. Its vastly increased speed has put at its disposal a dynamic lifting or depressing force which in amount almost rivals the total lift of the gas. Easily compensating the ordinary fluctuations of the gas lift, due to barometric conditions and changes in temperature, it resists far more formidable agencies like rising or descending air currents, impact of rain or hail, and even weighting of the hull with water or snow. That speeds of over sixty miles per hour permit its slow return to shelter

against adverse gales is as obvious as that its increased radius of action will make this slowness of return no bar to safety."

Raids on England were only moderately successful. On Sept. 4 the first moonlight raid over the London district occurred, in a slight haze which made the enemy difficult to see. On Sept. 30, there was another moonlight raid, also in a "slight mist;" but without clouds or wind. The most sensational air attack, towards the end of October (20th), resulted in the destruction or capture of four Zeppelins in France. These were returning from England, and had formed part of a squadron of ten or more. Reports mention that a strong NE wind prevented the Zeppelins from returning to their bases at their best speed. Other reports speak of their having lost their bearings in a fog. "Just as the aviator of today fears only the fog, so super-Zeppelins have just fallen prey on the wholesale, not to adverse winds, but to impeded vision. In the heavy mist they blundered, *in daytime,* into an enemy's country bristling with air defenses." On Oct. 31, during another raid, "mist and many light clouds gave the invaders an excellent chance of concealment." A raid over the southeast coast on Dec. 6 was made in "ideal weather for raiders." The moon was extremely bright in a clear sky, and no breeze was blowing." The long period of over a month without raids was probably due to the unfavorable weather which prevailed. On Dec. 18 an air raid on London was unexpected, "as the new moon gave very little light and there were intervals when the sky was clouded." It was thought that perhaps the raiders reckoned upon the help of light reflected from the snow which lay as a thin coating over the raided area. A raid on London on Jan. 28 was made on a night of "absolute clearness. There was a full moon and no clouds or wind." Two long parallel lines of captive observation balloons ("sausages") now stretch along the two opposing lines of trenches, from the North Sea to Switzerland, except when the wind is blowing so strongly as to make ascents impossible, or very dangerous.

The War at Sea

On Sept. 5, during "a thick mist," a German submarine bombarded Scarborough. A German attack on Dover was made (Feb. 14) in thick weather on a very dark night. The men of the American fleet were reported early in October as having been furnished winter clothing, including supplies of the extra heavy garments which British experience on their vessels during the stormy weather of the northern European winters have taught them to be necessary.

GEOGRAPHY MADE REAL BY FIELD STUDY*

By Jennie Hall
Central Junior High School, Springfield, Ill.

BEFORE discussing any form of teaching, we must first answer the question,—Why do we teach? To introduce and acquaint the child with that great heritage that civilization constantly leaves behind in the way of interpretation and application of Nature's few great but simple laws. Our task is a huge one, especially when we consider that all this realm of knowledge must flow into the human mind from or by means of experience only.

We talk of laboratory work, field work, text-book work, etc., as though they were things apart and separate. Not so,—all real teaching is laboratory or field teaching, if laboratory or field work means actual contact with the thing or principle studied, and no true teaching can be other than laboratory or field. It is contact study, contact of mind with matter or principle that governs matter and without this contact the mind can not grow. This law is as certain and definite as the law of gravitation.

If I teach within the four walls of a room and bring into that room every possible illustration of the subject being taught, explain, talk, study, apply those illustrations with my pupils until they become a part of each one's mind, the science teacher will say—"that is laboratory work;" the psychologist or training teacher will say—"that is supervised study or socialized study or humanized study," and I am privileged to call it field study, for what does it matter whether I take my class into the field, or bring the field to my class, if one is more convenient than the other, as it often is? I should like in this paper to discuss field work in this great, broad way for I do insist that it is all the same, but my time is too short to do justice to the complete subject so I shall include only that part of the work done outside our school room.

Then, first, why take the child out? We constantly hear that the interest in science in the High School is decreasing, Physical Geography is on the wane; we must admit that it is not the fault of geography, but of its presentation. I am confident that so long as there are boys and girls, there will be interest in any and every subject that is made interesting. It is not the subject matter, nor the text-book, nor the boy or girl that makes the interest, but it is

* A paper read before the Geography section of the Wisconsin State Teachers' Association, Milwaukee, November, 1917.

the teacher. It is the question of who is master—subject, book, boy, or teacher.

We, as teachers, must recognize the fact that the normal boy and girl is verifying the law of variation—that the youth of today is not like the youth of yesterday; whether better or worse matters not. If our normal subject of instruction is changing, our method must change and change at an equal rate. It is not easy to change a method; it takes more time, brain and nerve energy, but reason demands the change. Our normal boy today is of several types, unfortunately all in the same school group—the pampered child of overfond and unwise parents, expecting amusement and coddling, good marks and little work; the carefully guided child of other fond and wise parents, full of information resulting from much reading and seeing, always ready to advance and learn; the unguided child without initiative, using memory with good and bad results; the unguided child, with initiative familiar with all the town, shop and street can offer. These and still other types—boys and girls—are congregated into a group because they accidentally have advanced at the same rate in our public schools, and are called a class and given us to teach.

It does not take a psychologist to know that something is wrong, but all that matters not. While the psychologist is learning to regroup and resolve our problem, we have the group to teach. At present the problem is ours. We must get results, without friction. How?

One of the greatest hindrances to results is the habit of memorizing, learning what the book says, reading only lines, not between the lines. The page of the book makes no impression on the brain, a definition is only words. The normal boy glances at the lesson telescopically and then kills time. The normal girl either does nothing or reads microscopically, focusing only on the printed words, and recites phonographically. But if interest in the subject matter is first awakened by experiment or observation or illustration, then the book used, interest, thought controls, not memory. Impressions are the result, not mere traceries.

I would divide field work into problem and illustrative. A concrete example will best illustrate what is meant by problem work. For instance, before studying stream formation, I would take a group through a small stream bed, looking for the work of the water, using no names, but noticing where the pebbles and sand were deposited, where banks were cut, small rapids, falls, curves, etc., questioning as to reasons. Then I would give this group the test, asking them to find descriptions corresponding to what they had seen, and reasons for the same. Immediately the

text becomes a puzzle; every illustration is studied with interest and even the diagrams and graphs mean something. This book study I would follow with a second field trip to the same or new fields for verification and identification of name and formation. Practically all of Physical Geography can be studied in this manner.

I would include under illustrative work the visiting of factories, business firms, quarries, etc. Much of Commercial and Industrial Geography can be done in this way.

In the problem work, the small towns have a decided advantage for there man has not meddled with nature, and it is but a short distance to fields rich in material. On the other hand, the cities offer many times the opportunities for illustrative work.

Numerous questions naturally come to the teacher regarding field work, such as—When can we do it? How find time for it? What about discipline? All of these are serious questions requiring much judgment, wisdom, tact and planning, for if not wisely answered in the teacher's mind before attempting the work, failure is apt to result.

The ideal time, of course, is within school hours, though this is not always possible for the time is too limited. If the program can be so arranged as to give the last two periods of the day to the work, it is ideal. I have found little trouble in getting the pupils to do the work after school when necessary. In such an event equivalent time was given them from recitation or laboratory periods. When the pupil for any reason feels that he can not go out of school time, I have been in the habit of assigning him so-called equivalent reading to report on. Usually such pupils have found a way to join the class, often at the last moment.

The argument might occur to some that this sort of work takes more time, and that already too much is required in a given time. To such I would say that it has been my experience that the interest is so much greater, the impressions so much stronger and the knowledge so much more certain that time is saved rather than lost.

Regarding discipline:—In field work, as well as class room and laboratory work, interest takes care of discipline; it is the idle, uninterested boy who becomes a nuisance; so in field work the secret of discipline is plenty of work. The teacher should know her field absolutely and the route to the field should be very definite. An excellent opportunity is given for a good lesson in civics in connection with field trips—teaching the pupils the rights of property owners and the function of the school as well as the debt of the pupil to the state. A very definite outline of the

study expected, should be given to the pupils and a very thorough recitation with possibly a written exercise should follow. Care must be taken not to include too much in one trip, but to get the little very thoroughly. The groups should be small enough to be able to gather about the teacher and hear all that is said. A larger group becomes uncontrollable. I have found that the discipline is easier and the interest greater in seggregated classes, —boys, as a rule, are not interested in the same subjects that girls are, and their interest in the same subjects differ. The boy becomes restless through the necessarily long explanations that have to be made to girls.

It has been my custom to allow entire freedom on the outgoing trip to the field of study, requiring only that the group keep together near me, ready to stop and listen at a signal. When the field of study has been reached, I require the conversation to be strictly relative to the subject; note-books are taken out and outlines followed. At a signal from me, pupils gather for any remarks or directions or explanations I may wish to make. I then hold myself ready to answer their questions or guide their study. The lesson over, if out of school hours, I dismiss the class, letting each go home his own way.

In visiting factories, etc., I have found it best to go over the ground first, making arrangements and letting those who are to show the class about know what I most want the boys and girls to know and see. I have found business men more than ready and glad to give time and attention to this work.

What does field study do for the pupil? It does all that we most want to do, induces responsibility; for each one must solve his own problems and control himself throughout the trip; reliability, for he finds that he can solve his problems, and he becomes more reliant and self-respecting; individuality and originality, for the work is independent; moreover it gives a greater opportunity for real contact between teacher and pupil which reacts upon both, if the teacher is a true teacher.

It has been my experience that even the most troublesome children become less troublesome after such a trip, that classroom attitude and spirit are improved, that interest is stimulated, that teaching becomes more of a pleasure. In short, I am confident that no substitute for actual field study can bring the results that field study brings.

Possibly a part of the benefit comes from the contact with God's wonderful sunshine. Maybe the inocculation of our souls with that sunshine renews something within us. Often, when out on these trips, ideas such as these run through my head:

Build ye a city oh men,
Build ye a city fair,
But forget ye not, the soul must live,
And keep for us, here and there,
A plot of grass, a towering tree
Where over our heads, we, skies may see
And silvery stars on high.
Build ye a city oh men,
Build ye a city fair,
Our bodies needs must live by bread
But keep for us, here and there,
The good brown earth—the boundless sky—
Lest our souls ahungered, grow faint and die
Mid thy towering city fair.
Build ye a city oh men,
Build ye a city fair,
Build Gothic arch and marble hall,
But keep for us, here and there,
A plot of green, a waving tree,
Where, in times of stress, our souls may see
The light, for thy city fair.

SOME RESULTS OF THE LOCATION OF AUSTRALIA

By Stephen S. Visher
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THE location of Australia has largely determined its climate, has greatly affected its commerce, and has had a powerful influence on the character of its biota and population.

Effect of Latitude. The location of "The Island Continent" in latitude, mostly between the 15th and 30th parallels of south latitude and nearly bisected by the Southern Tropic, puts most of the area in the Trade Wind Belt. Since Trade Winds blow towards the Equator, from the south-east in the southern hemisphere, and hence into warmer and warmer latitudes, they are able to hold more and more moisture as they advance, and therefore normally are drying winds. Only where they are cooled by rising do they drop much moisture.

With the seasonal shift in latitude of the wind belts, the southern tips of Australia are reached by the Westerly Winds in "winter" (June-August), and are watered by them. These areas resemble Southern California in climate. Northern Australia is

in the Equatorial Belt in its summer, and receives copious convectional rains from moisture drawn southward by the monsoon winds which prevail there in that season. These winds blow towards the dry interior which is superheated then and consequently is a place of exceptionally low air pressure. Some northern coastal localities occasionally receive more than 100 inches of rain in their rainy seasons.

Effect of Mountains. The low range of mountains along the eastern coast of Australia profoundly affects the climate of a strip, perhaps 400 miles wide, but has relatively little influence on the climate of the rest of the continent. The much more rapid radiation, characteristic of even moderate mountain elevations, causes the warm, moisture-laden air, just off a warm sea, to become supersaturated, and it is compelled to drop a large share of its moisture. As a result, the rainfall varies on the eastern coast from 50 inches at Sidney, towards the south, to more than 80 inches in the warmer north. Soon after the summit of the range is reached, the air descends to lower altitudes and is warmed by compression. It thus becomes able to hold more moisture, which is proceeds to pick up by evaporation. Behind the windward mountains, Australia is dry. More than half the continent receives less than 15 inches of rain in an average year, indeed much of the interior receives less than 10 inches. Two thirds of the continent has no streams which find their way regularly to the ocean.

It is often assumed that the presence of this windward mountain range is responsible for the aridity of most of Australia, but this assumption is too sweeping. If there were no such range to rob the Trades of their moisture, most of Australia still would be arid, as are all fairly level stretches passed over by those winds. However if the winds hadn't already been so nearly deprived of their moisture, the few low elevations of the interior of Australia would cause more precipitation than they now do.

The Mild Temperature. Another result of the latitude of Australia is that cold temperatures are nowhere experienced, except in the higher mountains. Indeed all the continent, except the higher elevations towards the south, is practically free from killing frosts. Consequently pastoral pursuits and other out-of-door activities are not interfered with by cold. The livestock require no shelter from the cold. Hay is used in times of drought rather than of cold. Australia is "the land of picnics" partly, no doubt, because weather conditions are so favorable. It also has a remarkably low death rate (10.6 per 1000 of the population), doubtless partly due to climatic reasons.

Products. Since Australia extends from the truly tropical

regions to the 38th parallel, it is possible to grow a very great variety of products in the continent. Some of the many plants and animals which have been introduced do even better, in some respects, than in their native homes. For example, the highest price paid for wool is for Australian wool, and the highest price paid for wheat is for Australian wheat. Grapes do remarkably well in some sections, while an American cactus plant, the English rabbit and the fox find conditions congenial over wide areas.

Influence of Isolation on the Biota

The isolation of Australia since the dawn of the Age of Mammals, separated from Asia by the famous "Wallace's Line" through the East Indies or by wider belts of water, produced several highly interesting results.

Most people, when they think of Australia, recall the kangaroo. These animals are fundamentally different from the mammals with which we are familiar. One striking difference is that the young are born at a very early stage in their development, and placed in an abdominal pouch by their mother. The land mammals of Australia, except the bat and introduced forms, are closely related to the kangaroo and represent the lowest class of mammals, a class which is now practically extinct in the rest of the world, the opposum being the most notable exception.

While Australia had land connection with the continent of Asia, reptiles and birds of many sorts, and other lowly animals, and finally the most *primitive* types of mammals, established themselves. Since that remote date, the mammals of the rest of the world evolved amazingly and the diverse forms such as the cat, cow, giraffe, elephant, seal, bat, and monkey appeared in the other continents. Australia, due to its isolation, knew none of these higher mammals until the arrival of civilized man; two important exceptions were the bat, which had flown across the sea, and a dog, which had been brought in by the bush-man when he came by boat, thousands of years ago.

The lowly mammals of Australia differentiated too, and it is interesting to find animals simulating many of the types developed, among the higher mammals, elsewhere. For example, there are native mammals which resemble in habits and outward form, mice, rats, squirrels, bears, cats, muskrats, woodchucks and weasels. Such a diversity of forms, so closely related (all being marsupials), is an eloquent testimony to the influence of environment, and the results of specialization in habitat. The animals corresponding to our woodchuck and our flying squirrel, for example, lived in corresponding environments and necessarily acted some-

what similarly, and hence came to differ in habit and form from their relatives in much the way that our woodchuck and our flying squirrel differ from their relatives.

Not only were the native mammals peculiar, but many of the birds and most of the plants are too. Many of the latter are related, as in the case of the mammals, to forms now extinct in most or all the rest of the world. The characteristic tree of Australia is the eucalyptus. There are more than 300 varieties represented, adapted to nearly as widely different conditions as occur on the continent. In a land where there are no oaks or willows, some kinds of eucalyptus grow like oaks and some like willows; some grow where almost no rain falls, while others grow where there is very much. The "blue-gum," extensively introduced into California and Tropical America, in favorable localities grows to be more than 300 feet tall; some indeed, reaching 400 feet.

Influences of Remoteness on Commerce

The remoteness of Australia from Europe, Asia and other important land areas had great significance in its exploration and development and still influences its commerce powerfully.

The voyage from San Francisco to the nearest great port of Australia (Sidney) still requires nearly four weeks, while 35 days are commonly taken in the trip from England, going round Africa, and often more than seven weeks are occupied in going the 11,000 miles from England to Australia via the Suez Canal.

As two-thirds of the population of Australia is in the southeastern one-eighth of the continent, most of the people are 6,500 miles from Africa, 7,500 from South America, and about 4,000 from Asia.

Australia's exports are mainly products in active demand in the home country, and until the advent of refrigeration, they consisted largely of non-perishable products, and until recent decades, of products which were quite valuable per pound. Wool, hides, and precious metals long were the great exports. When efficient refrigerator ships were available, chilled meats, butter, and cheese were sent in increasing amounts to help supply the great British demand. Lately much meat has been exported, also. Now there are several hundred million bushels of wheat, purchased by the government from the farmers, stored in Australia awaiting shipment. Since it takes three times as long to take a cargo of wheat from Australia as one from the eastern United States, and since the submarine risk, around Spain, is estimated to be twice as great, the immense distance and the high freight

rates which the submarine has produced, bar so cheap a commodity as wheat, as it was barred in the days before the advent of numerous great, efficient, steel boats.

Influences of the Remoteness on the Development

Australia is so remote that it was discovered after most of the so-called New World was explored, and first settled in 1788, and then as an indirect result of the American Revolution with consequent closure of established penal colonies.

The remoteness resulted in immigration mostly of three sorts: penal colonists in the beginning only; immigrants of the laboring and servant classes brought over by wealthy land holders; and those who came of their own free will. The last class, far the largest, mostly were exceptionally daring, optimistic and independent, for only such would be likely to undertake so trying and expensive a trip as emmigration to Australia or New Zealand two generations ago entailed.

The fact that relatively few came to Australia, the great need for labor to develop the continent's resources, and the numerous opportunities to rise out of the laboring class, combined to make the labor problem a serious one and led to systematic attempts to encourage immigration of desired sorts, to higher wages and shorter hours, to legislation favoring the laboring class, to the introduction of American labor-saving machinery, and to other advanced procedures. The comparative remoteness, and the unreliable rainfall, also made it difficult to secure the capital required to develop the abundant resources. Thus the governments themselves were led to borrow money and accomplished many note-worthy tasks which are left in most countries to individuals, such as well-drilling, subsidizing ("staking") prospectors, and fence-building, in addition to the less unusual railway, telegraph, and road extension and management.

It seems almost self-evident that the following contributions are in no small degree the result of remoteness and consequences arising therefrom as listed in the preceding paragraphs. Civilization owes to Australians or New Zealanders the private balloting booth, without which voting cannot be independent, state insurance, compulsory arbitration of labor disputes, old age and disability pensions, the best code of mining laws yet worked out, and the conviction that the government should do everything for the people that it can do more effectively than the people individually can do for themselves. The principles of old age and disability pensions were early taken up by Germany and thus are sometimes incorrectly credited to that country.

THE ORIGIN OF PETROLEUM POOLS

By Edward Steidtmann
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INFERENCES as to the origin of petroleum or oil pools are necessarily limited by the known facts regarding their nature and occurrence within the earth. Since new facts are constantly being added to this field, there can be no theory of the origin of petroleum for which finality may be claimed. This sketch aims to outline some of the leading facts relative to the nature and occurrence of petroleum, and to present a few of the important inferences regarding its origin which are current at the present time.

The Nature and Occurrence of Petroleum Pools

Petroleums consist of a variety of hydro-carbon compounds of a bewildering complexity of composition. They are not as heavy as water per unit volume. In color, they range from black to colorless. The darker varieties are heavier, richer in asphaltic constituents, and less valuable than the lighter colored, so-called paraffine oils. Practically all petroleums contain sulphur in some form, and probably all contain nitrogen.

Oil or petroleum pools are local accumulations of natural oils filling the fine capillary tubes, fractures, and other openings of certain relatively porous rocks at various depths beneath the ground water level. The waters underneath the oil are in some cases salty, in others fresh. Natural gases, chiefly hydro-carbon compounds, sometimes fill the openings of porous rocks above the oil. Gas is also known to occur without oil beneath, and oil is often unaccompanied by gas.

Capping the porous oil bearing rocks, there are less porous or impermeable rocks which prevent the upward escape of the oil. Its lateral escape is prevented by the same cap of impervious rock and by the pressure of the water. Downward, the oil cannot sink because the water beneath is heavier than oil. The occurrence of oil in porous rocks capped by impermeable rocks in such a manner as to prevent the upward escape of the oil is so universal that the scientific exploration for oil simmers down mainly to a search for favorable rock structures.

The world wide search for oil in recent years, which the increased demand for oil has called forth, has shown that the architectural forms of the porous oil-bearing rock and the impervious cap rock are exceedingly varied. Nearly every oil district pre-

sents a type or types peculiar to itself. The porous rock in some cases is a porous sand or sandstone; in others, a cavernous dolomite or limestone, or a porous volcanic ash, etc. The various kinds of impervious cap rock found include volcanic rock, shale, limestone, etc. A classic type of structure consists of porous layers of sediments overlaid by impervious sedimentary beds, the whole arched upward into a dome or elongated arch. The lateral dimensions of such domes and arches vary from less than a mile to a score or more miles.

INFERENCES AS TO THE SOURCES OF PETROLEUM

Animal and vegetable matter buried in the sediments of past ages is accepted as the source of petroleum by most students of the problem. The generation of the constituents of petroleum from organic substances is chemically possible. They have been produced artificially from animal and plant fats and from black carbon bearing shales, lignites, and similar rocks.

Organic matter in rocks of various ages is the most widely distributed, most abundant known substance which is capable of producing petroleum.

There is a remarkably constant relation between the weight and composition of a petroleum and the ratio of fixed carbon to hydro-carbons in the rocks of the region in which the petroleum occurs. Oils found in regions in which the hydrocarbons of the rocks are abundant as compared with the fixed or elemental carbon are dark, heavy and low in certain hydro-carbons known as the paraffines. Where 60% of the carbon of the rocks is fixed or elemental carbon, the oils are light colored, light in density and rich in paraffines. Such a relationship cannot be regarded as accidental.

Probably all petroleums contain certain nitrogen compounds which it is believed could only be produced from organic substances.

It has been suggested that petroleum came from the interior of the earth by the interaction of steam on carbides in the earth or from hydro-carbon compounds in the earth's interior. Both views are purely speculative since no one knows whether such compounds exist in the deeps of the earth.

Volcanic rocks have been inferred to be the source of petroleum since some dying volcanoes exhale marsh gas, one of the chief constituents of natural gas. Some recently extruded volcanic rocks appear to have exuded asphatic substances. The great Trinidad asphalt deposit is closely associated with hot springs, the evidence of volcanic activity. The volcanic hypothe-

sis cannot be wholly discarded. A great difficulty in accepting it as important is due to the fact that evidence of past volcanic activity is absent in perhaps the majority of known oil fields.

The Generation of Petroleum From Organic Matter

Petroleum is generated by bacteria from organic matter slightly buried under mud and water. It is not apparent, however, that this is the source of oil in commercial pools. It may be that this bacterial action is important in preparing the organic matter for distillation after deep burial in the earth.

High temperature does not appear to be essential to the generation of oil from buried organic matter since most of the rocks from which the oil is believed to have come do not give evidence of having been at a high temperature.

The dominant factor which appears to have controlled the generation of oil from the organic matter of rocks is pressures due to the contraction or wrinkling of the earth's crust. It has been pointed out that oils associated with rocks containing a high proportion of fixed carbon are light colored, light in density, high in paraffines, and vice versa.

The nature of both the oil and the fixed carbon content of the rocks occurring with oil are dependent on the amount of wrinkling and compression of the rocks in which they are found. A high proportion of fixed carbon to other forms of carbon is found only in rocks which have been subjected to a high degree of compression while under a great load or to volcanic action. Commercial oil pools are not known to occur in rocks in which the percentage of fixed carbon relative to total carbon content exceeds 70%. The best grade of oils seems to be found in association with rocks in which the percentage of fixed carbon is about 60%, total carbon basis.

Although a close relation between petroleum and earth deformation is established, the exact mechanics by which this is brought about has not been made clear as yet.

The Accumulation of Petroleum Into Pools

The accumulation of globules of petroleum widely diffused through the rocks into commercial pools seems to be controlled mainly by three factors:—(1) gravity, (2) conditions which permit the oil to migrate towards a certain region in the earth's crust, (3) a favorable rock structure which prevents the oil from escaping from the region to which oil has migrated.

Oil generated below the water level tends to rise since oil is lighter than water. Gravity is thus the propelling force. Its migration upward is influenced by the size of the capillary openings

in the rocks through which it must pass, the position of the most porous rocks, and in some cases the circulation of the water, temperature and other factors. Its migration may also have been influenced by the wrinkling or contraction of the earth.

Oil globules from a great thickness of rocks have been trapped and permanently held where an arch or dome-like cap of impervious rock or similar structure blocked their further progress upward and held them at some depth below the ground water level. Had they reached the air or the rocks, their dissipation by evaporation, transportation by water, or chemical changes would have been certain. The varied nature of these favorable structures under which petroleums have accumulated has already been alluded to.

NOTES FROM U. S. COMMERCE REPORTS

Abstract of the Census of Manufactures

THE most recent statistics of American manufacturing industries—which, unfortunately, under existing law, are compiled only at quin-quennial intervals—are those derived from the census of manufactures taken in 1915, and covering the industrial operations of the calendar year 1914. The most important of these statistics are contained in the "Abstract of the Census of Manufactures," issued some time ago by the Bureau of the Census, which presents, in convenient form, with an alphabetical index, all the information needed by the great majority of persons interested in the progress and development of manufactures in the United States.

This publication, which is issued in the form of a 722-page volume 9½ by 6¼ inches in size, bound in cloth, is not for free distribution, but may be obtained by purchase from the Superintendent of Documents, Government Printing office, Washington, D. C., at 65 cents a copy.

India's Position in the Cotton-Goods Trade

Of the countries that supplied India with its $215,096,915 worth of imported cotton goods in the fiscal year ended March 31, 1914, only Japan and the United States increased their trade in 1916, the former to the extent of about $700,000, and the latter by about $400,000. New emphasis is placed on the fact that India is the greatest cotton-goods market.

Of the cotton goods imported in 1914, England supplied $193,-853,572 worth, Germany was next with $4,596,429 worth, Japan

following with $3,909,965 worth, Holland next with $3,440,207 worth, Italy next with $3,216,657 worth, Belgium next with $2,443,421 worth, Switzerland next with $1,218,995 worth, Austria next with $1,095,702 worth, and the United States next with only $848,961 worth.

Roughly, British India takes about 20 per cent of the total cotton goods exported by all the cotton-manufacturing countries of the world. The value of the annual imports of cotton piece goods into the port of Calcutta alone exceeds that of the imports of piece goods into any other single country in the world.

Bulletins Issued by Bureau of Fisheries

The United States Bureau of Fisheries has issued two bulletins giving statistics by months and by fishing grounds, respectively, of the quantities and values of fishery products landed at Boston and Gloucester, Mass., and Portland, Me., by American fishing vessels during the calendar year 1917.

The fishing fleet landing fishery products at Boston and Gloucester, Mass., and Portland, Me., during the calendar year 1917 included 493 steam and sail vessels. These vessels landed at Boston 2,962 trips aggregating 98,650,139 pounds of fish, valued at $5,166,440; at Gloucester, 3,074 trips aggregating 58,134,944 pounds, valued at $2,451,484; and at Portland, 3,248 trips aggregating 18,645,503 pounds, valued at $743,408. The total for the three ports during the year amounted to 9,284 trips, aggregating 175,430,586 pounds of fresh and salted fish, having a value to the fishermen of $8,361,332.

Exportation of Australian Frozen Rabbits

The exports of frozen rabbits from Australia has assumed large proportions. In the State of New South Wales alone 1,500,000 crates containing 24 rabbits each were packed for export during the year ended December 31, 1917, making a total of 36,000,000 rabbits, valued at $7,299,250. New South Wales exports comprise about 55 per cent of the total for Australia. The total exported from the Commonwealth was about 70,000,000, valued at $14,599,000.

Aside from rabbits being killed for food, millions are annually killed for their skins; also to rid the country of them as pests. Especially is this true in districts far from freezing depots or railways. There are about 50 depots in New South Wales, and about the same number in the other States, and there are five cold-

storage depots for export, with a capacity of about 600,000 crates, and about the same number in the other States.

Rabbits are trapped at night, and motor trucks belonging to the freezing companies collect them early in the morning, and deliver them to the nearest freezing works, where they are graded under Government supervision. They are then put into wooden crates and placed in freezing chambers, where they remain for nine days until frozen solid and ready for shipment.

The prices for the rabbits vary according to the distance from the freezing works, and the grades change from 12½d. per pair for specials, down to 3½d. per pair for kittens (very small).

Frozen rabbits are graded as follows: Specials, large blues, young blues, small blues, large seconds, young seconds, small seconds, and skinners (rabbits with skins off).

Increase in Burma's Rubber Production

Recently published statistics show that the rubber production of the seven leading estates of Burma during the first half of 1917 was 635,978 pounds as against 429,463 pounds for the corresponding period, and 445,150 pounds for the latter half, of 1916.

These estates turn out practically all the plantation rubber of Burma.

Oil Situation in South China

South China's trade in kerosene showed considerable improvement in 1917 over the previous year, imports into the Hongkong-Canton field amounting to 32,500,000 gallons, as compared with 27,500,000 gallons in 1916. Of the 32,500,000 gallons imported in 1917, 20,000,000 gallons (valued at $1,250,000 gold f. o. b. American port) were from the United States and the remainder chiefly from Sumatra and Borneo.

Japan Produces Excellent Wheat Crop

The actual wheat harvest of 1917 in Japan has been excellent, according to a report by the Department of Agriculture and Commerce, which is published by the Japan Advertiser. The prospect for 1918, too, is officially stated to be very good.

The exports of soya-bean oil from Darien, Manchuria, to the United States increased from 44,966,930 pounds, valued at $3,057,370, for 1916, to 198,534,626 pounds, valued at $19,740,640, for 1917.

Condition of the Canadian Iron and Coal Industries

The growth of the iron and steel industry in Canada during the past 10 years has been phenomenal, this being more particularly true of the past three years. Canada has within its borders

or within easy access in Newfoundland, all the essentials, such as ore, coal, and the necessary fluxes, for the manufacture of iron and steel. The coal fields are located at relatively convenient distributing points, the ore fields are easy of access, and the steel plants, particularly on the eastern seaboard, are excellently situated for both domestic and foreign business.

The industry has been further stimulated by the entry of the United States into the war, thus shutting off nearly all exportation of steel to Canada except that absolutely necessary for war purposes.

Canada is slowly developing a shipbuilding industry. During the past year many new yards were built which are now turning out vessels of moderate tonnage. Old yards have been enlarged, and while the total steel tonnage produced during the year was small, the increased facilities will result in considerable new tonnage being floated during the present year. This industry will be a large consumer of steel. At present much of the material needed will have to be secured from the United States, as the Canadian mills are not equipped to furnish the shapes and sizes needed.

NATIONS THAT HAVE DECLARED WAR OR HAVE BROKEN RELATIONS

Declarations of War

Austria against Belgium, August 28, 1914.
Austria against Japan, August 27, 1914.
Austria against Montenegro, August 9, 1914.
Austria against Russia, August 6, 1914.
Austria against Serbia, July 28, 1914.
Brazil against Germany, October 26, 1917.
Bulgaria against Serbia, October 14, 1915.
China against Austria, August 14, 1917.
China against Germany, August 14, 1917.
Cuba against Germany, April 7, 1917.
France against Austria, August 13, 1914.
France against Bulgaria, October 16, 1915.
France against Germany, August 3, 1914.
France against Turkey, November 5, 1914.
Germany against Belgium, August 4, 1914.
Germany against France, August 3, 1914.
Germany against Portugal, March 9, 1916.
Germany against Roumania, September 14, 1916.
Germany against Russia, August 1, 1914.

Great Britain against Austria, August 13, 1914.
Great Britain against Bulgaria, October 15, 1915.
Great Britain against Germany, August 4, 1914.
Great Britain against Turkey, November 5, 1914.
Greece against Bulgaria, November 28, 1916 (provisional government).
Greece against Bulgaria, July 2, 1917 (government of Alexander).
Greece against Germany, November 28, 1916 (provisional government).
Greece against Germany, July 2, 1917 (government of Alexander).
Italy against Austria, May 24, 1915.
Italy against Bulgaria, October 19, 1915.
Italy against Germany, August 28, 1916.
Italy against Turkey, August 21, 1915.
Japan against Germany, August 23, 1914.
Liberia against Germany, August 4, 1917.
Montenegro against Austria, August 8, 1914.
Montenegro against Germany, August 9, 1914.
Panama against Germany, April 7, 1917.
Panama against Austria, December 10, 1917.
Portugal against Germany, November 23, 1914 (resolution passed authorizing military intervention as ally of England).
Portugal against Germany, May 19, 1915 (military aid granted).
Roumania against Austria, August 27, 1916 (allies of Austria also consider it a declaration).
Russia against Bulgaria, October 19, 1915.
Russia against Turkey, November 3, 1914.
San Marino against Austria, May 24, 1915.
Serbia against Bulgaria, October 16, 1915.
Serbia against Germany, August 6, 1914.
Serbia against Turkey, December 2, 1914.
Siam against Austria, July 22, 1917.
Siam against Germany, July 22, 1917.
Turkey against allies, November 23, 1914.
Turkey against Roumania, August 29, 1916.
United States against Germany, April 6, 1917.
United States against Austria-Hungary, December 7, 1917.

Severance of Diplomatic Relations

Austria against Japan, August 26, 1914.
Austria against Portugal, March 16, 1916.
Austria against Serbia, July 26, 1914.

Austria against United States, April 8, 1917.
Bolivia against Germany, April 14, 1917.
Brazil against Germany, April 11, 1917.
China against Germany, March 14, 1917.
Costa Rica against Germany, September 21, 1917.
Ecuador against Germany, December 7, 1917.
Egypt against Germany, August 13, 1914.
France against Austria, August 10, 1914.
Greece against Turkey, July 2, 1917 (government of Alexander).
Greece against Austria, July 2, 1917 (government of Alexander).
Guatemala against Germany, April 27, 1917.
Haiti against Germany, June 17, 1917.
Honduras against Germany, May 17, 1917.
Nicaragua against Germany, May 18, 1917.
Peru against Germany, October 6, 1917.
Turkey against United States, April 20, 1917.
Unifed States against Germany, February 3, 1917.
Uruguay against Germany, October 7, 1917.

DEEPEST WELL IN THE WORLD

The deepest well in the world, already 7,363 feet deep, is now being drilled on the Goff farm, 8 miles northeast of Clarksburg, in northern West Virginia. Until January 24 the record for depth had been held by a boring at Czuchow, in Silesia, which had reached a depth of 7,349 feet.

Seven thousand three hundred and sixty-three feet is a very little less than one and a third miles. The depth of this well exceeds the height of Mount Washington (6,293 feet) and of Mount Mitchell (6,711 feet), the highest mountain in the eastern United States.

C. E. Van Orstrand, of the Survey, found that at a depth of 7,000 feet in the well the temperature is 152° Fahrenheit and that the rate of increase at this depth is about 1 degree in 51 feet of depth. This shows that the outer crust of the earth in this region is relatively cool, for in many other regions the temperature increases much more rapidly with increase in depth. Even at some places in the United States, according to unconfirmed observation, the temperature increases at the rate of 1° in a vertical distance as little as 25 feet, and that within a few hundred feet of the surface. Nevertheless, Mr. Van Ostrand estimates that the temperature of the rocks beneath the Goff well will be found at the boiling point (212° F.) at a depth somewhere around 10,000 feet.

RECENT PUBLICATIONS

CONCERNING CORNELL. By O. D. von Engeln, XVI+455 pages. Illustrated. Geography Supply Bureau, Ithaca, New York, 1917.

THE reason for referring to this book in the Journal of Geography is, primarily, that the volume includes a very excellent section dealing with the geography of the Ithaca-Cornell region. Furthermore, the book is written by Professor von Engeln of the Department of Physical Geography at Cornell. The book is a highly creditable work dealing with the history of Cornell University, the life of its founder, student life and activities in the institution, fraternities, athletics, and instruction. The lase two chapters deal with the geography and scenery of the beautiful Finger Lake region of New York. As a piece of book making, this volume is excellent. In every particular the work is artistic.

ORGANIC EVOLUTION. By Richard Swan Lull. The Macmillan Company, New York, 1917, pp. XVIII+729, 30 plates and 253 text figures. $3.00 net.

It is nearly sixty years since Darwin's Origin of Species gave scientific standing to the then theory of evolution. Today, it is no longer a theory; but probably the most fundamental fact of biological science. The ways in which evolution have been brought about, however, are still in debate. Much has been written relating to the mechanical processes of evolution and a wonderful wealth of evidence for evolution has been accumulated. Most of this material has been relatively inaccessible, not only to the general reader, but also to most students in other fields of scholarly endeavor, so that Professor Lull, in his Organic Evolution, has met a positive need. His many years experience in teaching organic evolution and his original investigations in that field have qualified him for the task of sifting and assembling the great fund of information and placing it in readable form.

The book consists of three parts. In part I are considered the development of the idea of evolution and the classification of animals and their geologic and geographic distribution. Part II deals with the mechanics of evolution and each of the different factors by which animals and plants may have advanced in development are clearly and fairly considered. In part III are given the evidences of evolution and here the author is at his best, as there has been available to him not only the discoveries of other investigators, but also the products of his own brilliant research.

The entogenetic and morphologic lines of evidence are fully considered, but particular emphasis is laid upon the evidence of paleontology and great surprise is in store for those who have not kept pace with the wonderful results which have come from the study of the fossils of extinct animals. In separate chapters are discussed the evolution of vertebrates and their emergence from the sea, the evolution of birds, mammals, elephants, horses, camels and man. The final chapter, entitled "The Pulse of Life" eloquently epitomizes the whole course of evolution.

The language of the book is simple and reasonably free from technical terms, so that it may be read with ease and pleasure, not only by the student of evolution, but by the general reader. In the reviewer's judgment, it is the best one-volume work on organic evolution which has yet appeared and it should be read by every one who is at all interested in the subject.

W. H. TWENHOFEL.

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FINLAND

By W. H. TWENHOFEL
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"STRAWBERRY Land," "Land of Heroes," "Last Born Daughter of the Sea," "Land of the Thousand Lakes"; such are the names the Finns delight to call their country. Suomenmaa, the Finnish name for Finland, means a country of swamps, and many thousand square miles fit the name. The name Finland—Fen-land—has the same meaning.

Situation and Size. On the west it touches Norway, Sweden, and the Gulf of Bothnia; on the east, Russia. Seven hundred miles from north to south, four hundred miles from east to west, it embraces an area about equal to that of all Great Britain, plus Holland and Belgium; and is greater by more than 20,000 square miles than all New England plus New York, New Jersey, and Delaware. The area is 144,255 square miles, of which about 11% consists of lakes, and a much greater percentage of swamps and marshes.

With the exception of a few islands and the ends of a few peninsulas, all of Finland is situated north of the parallel of 60 degrees. It holds about the same position in respect to latitude as does the southern end of Greenland, and nearly the whole of it is north of Labrador. The northern portions see the "midnight sun" and "white nights" are characteristic of the whole of Finland.

Geology. Finland appears to be very old. The surface rocks are among the most ancient of the globe, consisting almost wholly of granites, gneisses and schists, whose coarse textures attest their deep-seated origin and the immensity of the erosion which brought them to the surface.

Finland is a part of the Scandinavian plateau, which here varies from 400 to 600 feet above the level of the sea with occasional elevations rising to 2000 feet. The highest point, 4,100 feet, is in the extreme northwest. In general, the relief does not appear to be very great and sharp features are the exception.

GLACIATION. During the time of Pleistocene glaciation the country was deeply buried under great sheets of ice which moved from the northwest to the southeast. These ice masses pushed

the soil accumulations of previous ages to the southward. They were lost to Finland and given to Russia. In place of the soil, were deposited in an irregular manner great heaps of boulders, gravel and sand. Some of these are drumlins, others are moraines, while the road-like ridges, called eskers or osars, are characteristic and abundant features of the surface. Many square miles—particularly the uplands—are absolutely bare of soil, polished masses of solid rock forming the surface, while the erratics, or glacial boulders, in some places are strewn so abundantly that much land is absolutely unfit for any purpose. The numerous depressions created by glacial erosion and the many more made by glacial deposition are now the sites of the numerous lakes and the far more numerous swamps and marshes.

Climate. The summers are short and hot, the winters long and severe. Rainfall is ample, averaging around 10 inches in the north and 25 inches in the south. Most of it falls in August. Daylight in summer for the longest day varies from about eighteen to twenty-four hours. It is said not to be very dark during the long winter nights, the stars and the snow preventing such from being the case.

Natural Beauty. With the going of the frost and snow, vegetation is described as springing up as if by magic and in a few days the country is carpeted with flowers and green. Summer is a riot of beauty. In the forests are the white-stemmed birches in the midst of the dark trunks of the pine and the fir, the former with light-green, round-grouped foliage; the latter with a dark beauty of conical summits of somber green. Vegetation could not thrive more luxuriantly. The cleared land in many places is a gorgeous massing of wild flowers, while lilac and fruit-tree blossoms afford a beautiful setting to the Finnish farmer's home. Early summer sees strawberry blossom in wonderful profusion; mid summer the same places with a red-dotted carpet of the very sweet, but extremely small berries. Polished rock hills rise in the midst of lake, swamp, and forest. Swift flowing streams with clear water and many cataracts and rapids connect the sea with the beautiful island-dotted lakes hidden in the forest. Wild flowers, primitive forests, swamps, lakes, rapid rivers, rocky hills, and the sea make Finland beautiful.

The "white nights" of Finland are full of charming mystery even to those who know their explanation. The darkness is ghostly, and it is little wonder that the Finns have peopled their land with goblins and fairies and that the peasants see these still.

People. To him who has not seen Finland and its people it is likely to be little more than a name, but it is probable that

there is no more interesting people in Europe and there is certainly not a more progressive and delightful one. In a land of which only a small percentage is cultivated or can be cultivated, with a climate extremely severe, only a people of the very best type could have comfortably existed. The Finns, or the Suomi, as they prefer to be called, have done more than exist; they have developed a civilization which in many respects is the equal of any other in Europe, and is certainly the superior of many of them. Finland has looked west not east and, although a people which until recently was a part of Russia, its civilization is not Russian, but that of western Europe. Its association with Sweden is the basis of its civilization. Finland owes nothing of her progress to Russia.

There is much about the Finn that is admirable. He is essentially a conservative and a believer in obedience to law. His honesty and hospitality are proverbial. Bravery, perseverence and an intense love of liberty are attributes of the Finn which his history tells. His mental attitude is reserved. He is slow to anger; but, once aroused, he nurses his wrath for a long time.

The average Finn is not handsome. On the contrary, he is more commonly the opposite; but rarely is his face unpleasing. Beauty of face is perhaps more uncommon in Finland than in most other civilized countries, but the beauty of the inner man shines in the eye of nearly every Finn.

Population. Finland is not a densely populated country and it probably never can be. Beyond its forests, its stone and its limited agriculture, it has no great natural resources. For its unlimited quantities of stone there is no market. Its water power may some day lead to great factories, but that is still in the future. Hence, there is little in the way of natural resources which favors a large population. In 1911, Finland contained 3,154,284 people, about 22 to each square mile.

Cities. In spite of an extremely adverse natural environment, and of having been the battle ground of Russian and Swedish rivalry for 400 years, Finland has developed. Her cities, as Helsingfors and Abo, are clean, progressive and beautiful, particularly Helsingfors. They possess well-paved streets, beautiful parks, and Helsingfors has a number of beautiful buildings. Utilities are as fully modern as in New York or London. Dwelling houses are comfortable, clean and pretty. The country people dwell in clean, modern houses which are either one or two stories high, and nearly every home is said to have its bath house or bath room. The Finn has many kinds of baths, for cleanliness is almost a part of his religion.

Agriculture. The major interest of the people is in agriculture, although lumbering, fishing and commerce receive a great deal of attention. The chief crops are oats, barley, rye and potatoes. Between 8 and 10 per cent of Finland is under cultivation of which a little more than half is meadow. Recent years have seen a great development of the dairy and stock raising industry, one of the chief articles of export of Finland being butter. About the cities a great many people engage in gardening, raising vegetables and small fruits. At Helsingfors, these products are brought to the city in carts and rowboats—the numerous lakes, streams, and the canals making the latter especially useful—and are offered for sale in the open market.

Manufacturing has had a steady development within the last two or three decades, and with the utilization of the abundant water power there is bound to be a much greater development. Textiles, paper, and lumber are the more important products.

Of mining and quarrying, there is little. Copper occurs in a few localities, and it may be that development will prove the deposits to be greater than present indications suggest. A little gold has been washed from the sands of some of the northern rivers, but the quantity has been too small to warrant hopes of ultimately finding important deposits. There is a little bog-iron ore. Of structural stone, Finland has enough to supply the world. This is chiefly granite. Distance from a market prohibits the development of this industry.

Fisheries. The lakes, rivers and the sea contain an abundance of fish, and fishing affords a permanent occupation for a considerable number of people and a part time occupation for many more.

Sailors. Many Finns are sailors. Before the outbreak of the present war, a large percentage of the ships plying the Gulfs of Finland and Bothnia were reported to have been captained, officered, and manned by Finns, and the many boats connecting parts of Petrograd were said to have had officers and part of the crews of similar origin. Judging from statements made to the writer by people of Petrograd, the Finn appears to have an excellent reputation as a sailor.

Education. The literacy of the Finnish people is extremely high, the illiterate apparently being less than 5%. These appear chiefly to be followers of the Greek church. There are many learned societies and before the beginning of the regime of Russification there were forty Finnish periodicals and journals and more than thirty Swedish ones. At the head of the system of

education is the University of Helsingfors. This is open to both men and women and has almost as large an enrollment per capita as most American State Universities.

The people are intensely interested in learning. This is everywhere in evidence, and is particularly attested by the character of the literature handled by the many bookstores of the large cities. There was nothing in Helsingfors that more impressed the writer than the scholarly character of the books handled by these stores. He has not seen anything in any American city which is comparable.

For the last decade prior to the war, the educational system has had an uncertain future. The deadening weight of Russian autocracy was beginning to make itself felt. Nicholas II, false to his pledges to Finland, had permitted the Russification of this delightful people to make headway. A Russian had been made chancellor of their famous University; Russian officials were being placed in charge of the civil administration; prominent men were being sent to Siberia and a rigid censorship had led to the suppression of several of the Finnish journals.

Contrasts. Before the war, one could best appreciate Finland by entering the country from the Russian side. In that way the excellencies of Finland were emphasized because of the glaring defects of Russia. One had a feeling of relief on leaving the deadening, poison-like, filthy atmosphere of Russia behind and reaching a country where the aspect was that of cleanliness, the open field and freedom. The contrast was noticeable as soon as the station of the Finnish railways (most of the railway lines are state owned) was reached. The ticket was sold with proverbial Yankee efficiency. The station was clean and the officials answered questions without delay or compromise. The beggars, the slowness and the characteristic "nitchevo" of the Russian were wanting.

Boarding the train, it rolled out of Petrograd and passed through the country to the northwest. The houses were tumble-down affairs, built of logs and covered with reed or straw-thatched roofs. The inhabitants, both sexes, were dirty, were commonly barefooted, and such clothes as they wore were commonly not clean. Everything had a primitive appearance. Suddenly the whole aspect changed and the change was synchronous with the passage of the train over the Finno-Russian boundary which, as a knife edge, divides civilization from unnatural primitiveness. The houses on the Finnish side of the boundary were neat and clean in appearance, the roofs were of shingle or tin, the houses had seen paint, many of them had telephones, the

fields had the appearance of being intelligently cultivated and many were well drained. The country people wore shoes, their clothes were clean and they had the aspect of being able to look "the whole world in the face" and of fearing "not any man."

Helsingfors was reached. The streets were straight and clean. They were paved, not with cobblestones, but with modern pavement. The sidewalks were wide. The people were clear-eyed, clean-skinned and nicely dressed. The many parks were filled with mothers and their children; the former were knitting, sewing or reading, the latter playing on the grass. Instead of numerous saloons, there were bookshops. Drunkenness, which was rife in Reval, Wesenberg, Petrograd, and other Russian cities visited by the writer, was not noticeable. Beggars, so common in Petrograd, were not to be seen. Electric street cars, clean and modern, rivalled those of any American city.

A Russian and a Finnish City. There is probably nothing that more strongly brings out the difference between Finland and Russia than a comparison of the conditions in Helsingfors and those of the city of Reval in Russia. In 1910 the former had a population of a little more than 150,000, the latter a population of about 100,000. The former has numerous modern paved streets, the latter has none; the people of the former have a clean, neat and contented appearance, the people of the latter an almost opposite aspect; the former has a modern electric transportation system, the latter has about five miles of railway with three or four cars, each small and pulled by a single horse; the former has highly educated people with a small percentage of illiterates; the latter an extremely illiterate people with only a small percentage with even the rudiments of an education.

What is responsible? The natural advantages, and the trade and manufactures of Reval are the equal if not the superior of those of Helsingfors. There is little difference in the type of people. The explanation is to be sought in the Russian and Finnish governments.

The Conquest by Russia. Legend states that the Finns formerly dwelt along the Volga and were driven northward by the migrating Slavs. Ultimately they were Christianized by the Swedes and for 500 years Finland was Swedish territory. During the last 400 years of this period Finland was the battle ground for Swedish and Russian armies. Time after time the land was devastated and thousands of people were killed in battle or died of starvation and exposure. Short intervening periods of peace permitted recuperation of the population and the rebuilding of

homes. The Russian frontier gradually advanced over Finland and in 1809, following a complete Swedish defeat at the hands of Russia, Finland became a Russian province, the Finns being guaranteed their religion, their laws and their constitution. This pledge Russia religiously maintained until the reign of the recently deposed Czar, Nicholas II. He was taking from the Finns their liberties one by one, and the Russification of this progressive people was well on the way. Their ablest journals were being suppressed, their ablest men were being sent to prison or to Siberia, creatures of Russian bureaucracy were being placed in positions of power, and a decade more would probably have seen Finland reduced to the degraded condition of an ordinary Russian province.

The Future. What the future holds for Finland no one can say. The Russian Revolution interrupted the process of Russification and Finland was quick to seize her opportunity. If left alone she would no doubt have taken her place as a valued member in the world's family of nations. At the present, however, she seems to have been released from one autocratic rule, but to fall into the hands of a different one. She cannot hope for much from Germany. It is certain that German rule will be equally as deadening to the Finnish people as would have become the Russian one. It is to be hoped that events will so shape themselves that Finland may be left to work out her own destiny, which, if one may judge from her past, will be ably done, and that her present and her past oppressors may rise from their offenses to become sister nations in a world of changed ideals.

THE NATURAL RESOURCES OF AUSTRALIA

By Stephen S. Visher
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THE people of Australia are nearly all optimistic concerning the prospects of their continent. When we consider the resources which they list, we see that there is considerable reason for optimism. An area nearly as great as that of the United States, occupied by less than 5,000,000 persons, ought to afford each family a considerable opportunity. To be sure, much of the area is not valuable, but they are quick to point out that only one fourth of the area of the United States is tilled, and much is hopelessly arid, while large sections are marshy, rugged, or stony. Australia is rich in more than area. Most of the continent is a plain; most of the soil is remarkably fertile; the mineral wealth is very great and "scarcely scratched"; the climate is acclaimed

as delightful; water-power possibilities on the eastern highlands are alluring.

Productive Land

It is generally conceded that one of the most significant facts in regard to any area is the extent of its land capable of producing food, clothing, and wood in competition with other areas. Australia possesses a total area of nearly 3,000,000 square miles. At present less than one percent of this huge area is in crops. It is estimated that twenty times the present tilled acreage could be cultivated successfully with present methods. Vast areas, as good or better than most of the land now tilled, are held in enormous estates and given over to grazing. However, means of breaking up these estates are being seriously considered, and various methods have already been tried. Attempts at state purchase and resale to settlers have been mostly unsuccessful because of the inflated valuations involved. A classification by experts of all lands according to the use they can best be put to, and then a differential tax, and in many cases a heavy one, is being urged as the most likely method of forcing proper use of the land.

Another large proportion of arable land not now tilled will be when railroads, roads, wells, and other improvements of like nature are more widely accomplished. Of late progress has been made by the state in supplying areas with such necessities, and in aiding settlers in the clearing of their land of brush (scrub).

Farming Conditions

The use of farming methods adapted to dry regions is becoming more and more general. One of the interesting adaptations is the header-harvester. The straw of grains varies greatly in length with variations in rainfall. In semi arid regions it is often too short to be bound into bundles by a harvester. The header, evolved in Australia, but now widely used in our western states, avoids this difficulty by cutting off the heads of the grain and delivering them to a box-rack driven along side, or directly to a separator which promptly threshes out the grain. This invention made possible a considerable extension of wheat culture into the belt where droughts are frequent. The marked increase in the price of wheat is another factor of great significance in extending the area in which wheat can be grown profitably.

Just how large the area is that can be used successfully for crop growing depends ultimately on the moisture requirements of the crops adapted to the soil and temperature. On the assumption that in a mild temperate climate, twenty inches of rain will support agriculture of the type practiced in Australia, it is semi-officially estimated there is available for crops 480,000 square

miles, (307,000,000 acres) or 16% of Australia. This area is larger than Germany and Austria-Hungary combined, and nearly equal to the combined areas of North and South Dakota, Nebraska, Kansas, Oklahoma, Missouri, and Indiana. It is, indeed, only 10% less than the combined cultivated acreage of Europe, Russia excepted. Such comparisons as these are one basis for Australian optimism.

In the vast area, (84% of the continent) which does not now appear to be available for ordinary agriculture, large areas will be grazed.

Irrigation has been practiced for decades in favorable localities on the lee side of the Dividing Range, especially in New South Wales. Recently some important projects have been undertaken by the government. One of the most notable projects in the world is that near Berembed, where 250,000 acres will soon be irrigated. Many smaller areas will be reclaimed in years to come, some by artesian wells, as there is an extensive region in which artesian water can be obtained.

Animal Industries

Australia long has been the greatest wool producing country in the world, and it supplied 33% of the world's export in 1913. Since the advent of refrigeration ships, the number of cattle has been increased rapidly, and now the meat and dairy products exported are far more valuable than the hides, skins and tallow which were formerly the only animal products exported besides wool. Now, too, the export of "frozen" rabbits and rabbit skins is an appreciable item—nearly $5,000,000 in 1913. The rearing of goats, scarcely commenced, is sure to be greatly extended in the future since there are wide areas where no other use can bring so great a return, and the demand for mohair is increasing very rapidly.

Fluctuations of rainfall constitute a very serious obstacle to full utilization of land. In fact little of it can be used to its full capacity since that capacity fluctuates so widely in most of the continent. An area which has an average rainfall of 20 inches may receive 30 inches one year and 10 the next. But with the extension of government-operated railways, and an increase in the shipment of stock from drought-affected areas to ones which are then favorable, with an increase in hay-saving and with more state aid in the way of supplying seed and stock after drought, now going on, it appears likely that much of the land will be used to approximately its capacity during normal years.

Tropical Australia

The tropical part of Australia affords separate problems. As yet it is almost unused since the importation of "colored" labor

is prohibited and whites still find cooler regions more attractive. However, climatic conditions in most of the area are not such as to discourage the hope that areas well adapted to growing sugar, cotton, cocoanuts, and tropical fruits will be used.

Mineral Wealth

Gold was first discovered in 1851 in New South Wales. From time to time, since, new gold fields have been opened up, the last important one being in Western Australia in the 1890's. Australia has held a prominent place as a gold producing country since 1851, ranking second to the United States until 1900, when for three years it led the world. Since then, however, it has declined and has been surpassed by South Africa, as well as by the United States, and is now third. Although a large share of the thousands of millions of gold secured has come from placers, there are many very rich deep-mines which doubtless will continue to yield for a long time, and of course in so new and large a country, new discoveries are sure to be made.

Australia has the largest silver-lead mine in the world, (The Broken Hill Mine in New South Wales) and has ranked next to Mexico and the United States in silver production until recently, when Canada surpassed her.

Although the production of copper, mostly in South Australia, is not large, the known reserve in Mt. Morgan, Queensland, and at other points is so vast as to compare favorably, it is said, with the known reserves in any state of the United States. Tin is mined in four states to a sufficient amount to give Australia a prominent place among the countries of the world in the production of this important metal.

Lead and zinc are produced in large quantities, and the greatly increased output since 1914 suggests that exhaustion is remote.

Coal is mined to the extent of some 13,000,000 tons, (1913) annually, mostly in New South Wales. Large deposits are known also in Queensland and Victoria. The estimate issued by the Twelfth International Congress of Geologists, (1913) in its three volume report on "The Coal Resources of the World," accredits Australia with more than 165 billion tons of coal, a reserve more than 50% greater than the combined known reserves of South America, Africa, and Middle America, and approximately the same as that of Europe, Great Britain and Germany excepted. The location of the coal along the eastern mountain range is an influence supplementing that of rainfall, water power, and harbors which will tend powerfully to keep the eastern side the leading part of the continent.

The Climate

The character of the climate of Australia is a great asset and at the same time the chief handicap. The healthfulness of most of the continent is demonstrated; the winters are so mild that outdoor activities are not interfered with, and no shelter from cold is required by livestock; few fruit growers have any fear of killing frosts; the balminess encourages picnics, which are enjoyed frequently by nearly all; the dry harvest season of the chief wheat growing sections gives to the wheat kernel a brightness and hardness quite unusual for a white-flour wheat, and secure for Australian wheat the highest price paid on the world's market (Liverpool).

The contrast in climate of different parts of the continent increases the variety of the continent's products and thus increases its independence. Corn is the chief crop in Queeensland, where, towards the north, sugar cane, cotton, bananas, and other tropical fruits thrive; subtropical fruits do very well in New South Wales; winter wheat and wool are the chief products of the cooler south, where, however, most temperate zone products are produced.

Variability of climate is appreciated by few; in fact, it is complained about in all parts of the world. Nevertheless, though frequent droughts are the Australians' "family skeleton in the closet," these variations have tended powerfully to stiffen determination, encourage resourcefulness and hardihood, eliminate those who are too easy-going, and encourage the scientific study of climate. It is recognized that Australian studies in meterorlogy and climatology have contributed much to those subjects, surprisingly much when it is recalled how meager the population is, and how brief the history of the settlements.

Other Resources

Of the native plants, grasses have been most significant. There are hundreds of kinds, many highly valuable. Most of the shrubs are of little use. However, one, a "salt bush," is said to give when pastured by sheep a brilliant luster to the wool. This luster is a chief factor in securing for Australian wool the highest price paid. The eucalyptus tree is the chief forest resource of the continent. Though most of the 300 species are small, the "bluegum" is the world's tallest tree, and much wood is secured from it. One trunk had a diameter of six feet 300 feet from the base, and trees having a height of nearly 400 feet are not very rare. As the wood is hard, it can not be used for ordinary lumber, hence much soft wood is imported. The wood is excellent for poles, railway ties, wharf piling, and paving blocks.

The water power resources of the eastern mountains are much increased by the precipitous escarpment of the Blue Mountains, and perhaps exceed those of our eastern highlands.

Australia has the world's largest artesian basin, and thousands of wells have tapped it, with benefit to settlers in sections where streams and shallow wells are not to be relied on. Unfortunately many wells yield salty water, and hence are not useful for irrigation of ordinary crops. Some of the freshwater flows are so voluminous that an appreciable amount of irrigation is done by their waters.

The harbor of Sidney is one of the very best in the world, and there are several other excellent "bottle" harbors along the eastern coast which are mentioned among the continent's assets.

The levelness of most of the continent has facilitated travel. After the summit of the eastern mountain range is once crossed progress is little hindered by topographic features, and in many places roads are scarcely necessary, and railways can be built almost perfectly straight for long stretches. There is a section of the trans-continental line, completed Nov. 1917, which has no curve for 330 miles, and only one curve in 430 miles.

Unfettered by Tradition

Another asset of Australia, a result of its remoteness, is the newness of the region so far as white man is concerned. First settled in 1788, the population remained very small until 1825, and in 1851 there were fewer than 480,000 persons on the island. Australia has relatively little of the "dead timber of by-gone ages" to block progress, and although vested interests are strong even in Australia, they, and tradition, have not been the barrier to progress that they are in most countries. Having been settled so late, advantage was taken, both by the colonists and by the British government, of many lessons learned in America and elsewhere, and of discoveries, inventions, and other contributions to civilization, and there was less groping about and less bungling.

Also because of the remoteness, immigration was less diverse, pell-mell, and overwhelming than in America and thus the course of civic development was less disturbed. There was also a selection of immigrants, many of whom were exceptionally daring, independent, and optimistic. These results of remoteness are probably a chief factor in enabling Australia to outstrip, in a few decades, the rest of the world in regard to several important social advances and now to stand at the forefront of the battle line of civilization. Consequently even remoteness must be counted as an asset, as well as a handicap.

THE PROJECT-PROBLEM METHOD IN THE TEACHING OF GEOGRAPHY

By Mendel E. Branom
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What is a Project-Problem and How Should it Be Secured?

A WELL-DEFINED problem, requiring a consideration of much material for its solution, may arise in connection with the study of an exercise in geography. Such a problem may be called a project-problem. This type of problem should not be confused with the "simple-problem" around which the work in geography, in some cases, has been organized. According to the "simple-problem" method, the teacher merely gives the class a problem as an assignment. She may say, for example, "Tomorrow, you will consider whether St. Louis should be compelled to pay twenty cents a ton more for Illinois coal than East St. Louis. You will find material, concerning this problem, on the reference shelf. Class is excused." Her assignment lacks motivation. She has done almost nothing to arouse interest in the problem. The children may begin work on the problem, because they have been taught to obey the teacher. If they eventually become interested in the problem, it will be in spite of, and not because of, the way the problem was secured and assigned.

The project-problem method, not only has all of the advantages of the "simple-problem" method, but is strong where the latter method is weak. An exercise, may be given, which will bring out the discriminations in freight and passenger rates to the advantage of East St. Louis, including the "arbitrary" on coal. This exercise may be motivated by an appeal to the newspapers, which state that the Chamber of Commerce recently has engaged Ex-Governor Joseph Folk, for three years, at a salary of $12,000 a year to fight the "coal arbitrary." As a result of this preparatory exercise, the class may secure a real problem in which it is interested. The project-problem, eventually secured, may be practically the same problem that was given by the "simple-problem" method. The way that the problem originates, however, is vital. The child has a personal interest in the project-problem, and actually feels a need for its solution.

The Solution of a Project-Problem

After a problem, whether a "simple-problem" given, or a project-problem arising, has been placed in the hands of a class, the steps, involved in the solution of each type of problem, are the same. The superiority of the project problem, however, is

shown by greater enthusiasm in the securing and interpretation of pertinent material. If the problem is "Should St. Louis be compelled to pay twenty cents a ton more for Illinois coal than East St. Louis?" such topics as the following should be discussed: the location of the two cities with respect to the Illinois coal fields; the absolute dependence of both cities on Illinois coal; the Mississippi River barrier, and the heavy expense involved in overcoming this barrier through the construction of bridges; the mutual inter-dependence of the two cities because of their location in the same industrial district; the historical development of transportation giving rise to rate differentiations; the custom prevailing elsewhere under similar conditions; the discrimination against St. Louis with respect to Illinois coal, but no discrimination against East St. Louis with respect to cattle originating west of the Mississippi River; recent rulings, applicable to the St. Louis situation, of the Interstate Commerce Commission.

As a result of the detailed consideration of these topics, the problem may be solved, or the material summarized. It is not necessary that all problems shall be solved. Adults, in many instances, after a detailed consideration of a problem, may merely summarize the material and withhold judgment. Each pupil has a right to his own conclusions, and, after a searching analysis of material, if the problem is not solved, open-mindedness should be encouraged. Whether the members of the class reach definite conclusions, or whether, unwilling to exercise final judgment, they merely have analyzed the material and summarized results, the purpose of the project-problem has been achieved.

Advantages of the Project-Problem Method

The project-problem method has the following advantages: (a) geographic material is considered, as people, in general, consider it, in relation to problems. This method should develop in pupils an ability to interpret the geographic factors involved in problems of timely moment; (b) memory work involved is memory work in relation; (c) the consideration, selection, and elimination of material requires considerable ability in rational thinking; (d) skill in the use of the mother tongue for expressing, as well as for transmitting, thought is developed; (e) since the problem is a personal problem for each pupil, a favorable situation for problem mastery is established; (f) the team work involved in solving problems affords training for the pupils as members of a social group; (g) problems call forth ability, along various lines, thus tending to an harmonious development; (h) the problem method suggests a criterion that will help in determining the relative ability of children.

An apparent weakness of this method is an actual strength. The relative lack of ability of the weak pupils readily is indicated. It is to be expected that a few of the pupils will show marked ability, that a few will show marked inability, that the majority will show ability in the solution of problems. This is the situation, whether children or adults are being considered. The school room practice will differ from the practice of the busy adult group, in that the teacher will strive to develop each individual to the limit of his capacity, while in the after school days, most pupils will have no such guiding hand. In general, provided the right moral and physical qualities are present, and remain present, the pupils, who show marked ability in problem solving, probably will continue to grow until they have become leaders of thought and action among men; the pupils, who show mediocre ability probably will constitute the great class of society, that can weigh intelligently the factors involved in the problems analyzed by the leaders; the pupils, who show marked inability, few in number, probably will be dependent on the preceding two classes, both for leadership and direction. The teacher will attempt to secure a maximum development of each member of the class, but it is an advantage of the method, that, in spite of this attempt, the pupils will tend to fall into groups according to ability.

Difficulties and Dangers of the Project-Problem Method

The greatest difficulty in using the problem method, from the practical standpoint, arises from the inability of pupils and teacher to secure satisfactory and varied material, bearing on the problems. Teaching is bound to be unsatisfactory if there is a class for solving a problem, but little or no material available through the study of which the problem can be solved or considered. Maps, pictures, museum material, supplementary readers, magazine articles, and newspaper clippings, bearing on the important relations of man to his environment in the various countries, should be collected. This nucleus of material, supplemented by any material the pupils can secure, may be the basis for problem solving.

The school material, bearing on a problem, should be placed conveniently for the use of the pupils. It is an unnecessary waste of the pupil's time to give vague directions as to where material can be secured. The project-problem method does not demand that a child shall wander aimlessly through numerous volumes, accidentally stumbling upon pertinent material. The significant thing is not that general material shall be found, but that, from this material, selections shall be made and interpreted to

meet the demands of the problem. Pupils, however, should be encouraged to secure supplementary material. It is a mistake to have numerous duplications of the same reference. As many different references as possible should be secured. Variety rather than uniformity should govern in the selection of supplementary material for problem work. Pupils, reading different articles, will be stimulated differently, and will come to class expecting to make actual contributions. Through the co-operation of all members of the class, the problem should be solved.

With respect to a given areal unit, as Australia, China, or Japan, in some cases it illogically has been assumed that a problem must be raised, the solution of which will involve all factors worth while with respect to the areal unit. Under the guise of a problem, consequently, pupils are permitted to make contributions concerning the areal unit whether related to the solution of the problem or not. Loose, superficial, inaccurate thinking thus is encouraged. The teacher and not the problem method is at fault. Only contributions of significance in solving the problem should be accepted. A class spirit, unwilling to entertain inaccurate or non-pertinent discussions, gradually should develop. If there is other geographic material concerning the country under consideration that should be discussed, this may be taken care of through exercises or other problems. Sub-problems may aid materially in the solution of a project-problem. Sometimes the sub-problems require explanations, which may give rise to other problems and so on. The teacher may make a serious mistake by permitting the class gradually to move from sub-problem to sub-problem until it has lost sight of the original problem. The class is lost. In general, any material not bearing directly on the problem should be rejected, and the sub-sub-problems suggested may be listed for consideration after the study of the project-problem has been completed.

Illustrations of Project-Problems

The following synopses indicate what is meant by project-problems.

Illustration One. Preparatory step: Denmark once offered to sell the Danish West Indies to the United States, but the United States refused to buy; later, the United States wanted to buy the islands but Denmark, under German influences, refused to sell. In 1917 the United States was willing to buy and Denmark was willing to sell. The United States purchased the islands for $25,000,000.

Problem raised: Are the Danish West Indies worth the price?

Materials secured and interpreted: The islands were considered from the standpoint of pastoral, agricultural, mining, fishing, and manufacturing possibilities, from the standpoint of their strategic location in guarding the eastermost entrance to the Caribbean Sea, and the Panama Canal Zone.

Problem Solved: The islands are worth the price because of their strategic importance in helping the United States to watch over its interests in the "American Mediterranean."

Illustration Two. Preparatory Step: A terrible explosion in Halifax Harbor killed hundreds of people and destroyed millions of dollars worth of property.

Problem raised: Of what importance is Halifax to the allies in the present war?

Materials secured and interpreted: Such topics as the following were brought out in the discussion: the location of Halifax with respect to the main route of travel between the United States and Northwest Europe; harborage facilities, character and extent of the hinterland; transportation facilities; industrial establishments.

Problem solved: Halifax is important to the allies because of an excellent harbor, location on an ocean highway of commerce; rail connections with the interior, and essential industrial establishments.

Illustration Three. Preparatory step: A few months ago, the Central Powers started a powerful offensive, looking toward the subjugation of Italy.

Problem raised: Of what value would Italy be to the Central Powers?

Materials secured and discussed: Such factors as position, coastline, population, and resources were discussed.

Problem solved: Italy would be of value to the Central Powers, because of its proximity to Central Europe, its peninsular extent into the Mediterranean, its irregular coastline, its economic resources, and its man power.

Summary

From the discussion, it will be noted that there are four interlocking steps, involved in the project-problem method: (1) preparatory step, involving a consideration of material out of which a problem may arise; (2) a problem is raised and concisely stated; (3) materials pertinent to the solution of the problem are secured and interpreted; and (4) the problem is solved or the material is summarized. All of these steps need not appear in a single recitation. An entire recitation period, for ex-

ample, may be devoted to a discussion of the preparatory material, and the raising of a problem. Several recitations may be given over to a solution of the problem before the last step is reached. It is not believed that the project-problem should be used exclusively in geography teaching. A method, however, that offers so many advantages should receive careful consideration. No geography teacher should be satisfied until she thoroughly has mastered the details of this method.

THE GEOGRAPHY OF PALESTINE

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THE land bordering the southern part of the eastern coast of the Mediterranean Sea has been known at different periods by various names. Usually it has borne the same name as that of the most prominent of the tribes, or peoples inhabiting it. Thus, Canaan, from the Canaanites, became, after its conquest by the Israelites, the Land of Israel; later, as the Jews became more prominent, the name Judea appeared; and finally, it came to be known as Palestine, from the Philistines who lived along the southern coast.

As a land rich in historical interest, as the birthplace of three of the world's greatest religions, and the scene of one of the most remarkable geological phenomena of the earth, the rift valley of the Jordan, it would be hard to find another region within such narrow limits, containing so much of interest to the student of history, whether religious, political, or geological.

The present Palestine extends somewhat beyond the historic Dan and Beersheba limits. Reaching from Mounts Lebanon and Hermon in the north, to the great Hajj Road in the south, and from the Mediterranean Sea to the Arabian desert, it embraces a region, roughly rectangular in shape, with an area of about 12,000 square miles, nearly equal to that of the state of Maryland.

The Arabian peninsula, of which Palestine is one of the most productive parts, occupies an intermediate position, not only between three continents, but also between the three oldest civilizations of those continents. Consequently, it had served from time immemorial as a bridge for intercourse between Europe, Asia, and Africa. But, with the coming of the steamship, the building of the Suez Canal, and the discovery of other routes, the traffic was diverted so that today not only are the old caravan routes

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largely deserted, but the southern portion of the peninsula, almost within gunshot of the Suej, is as little known as Central Africa.

From this position of retirement, forced upon it by the changes of time and the blighting rule of the Turk, Palestine has again emerged. The recent English campaign there, one of the most interesting of the present war, has attracted the eyes of the world to this almost forgotten land. The geographic influences, which in the past have so greatly influenced Palestine's history, are still operative, and in the present world struggle, have served to develop a type of modern warfare peculiarly adapted to desert conditions.

Though Palestine is largely mountainous, there are four well defined physiographic regions, based upon differences in topography. These regions extend from north to south in roughly parallet belts. Traveling from the Mediterranean Sea eastward to the interior, one crosses, in succession, the coastal plain, the Lebanon mountains, the Jordan valley, and the anti-Lebanon ranges.

The coastal plain, a long, narrow belt of undulating lowland, is interrupted at only one place: at Acre, a westward reaching spur of the Lebanon Range, Mt. Carmel, crosses the plain and forms a rocky promontory overlooking the Mediterranean. To the north, is the narrow plain of Phoenicia, averaging only four or five miles in width. To the south, the coastal belt rapidly widens, forming the plains of Sharon and Philistia. Next to the Mediterranean, the plain is sandy and barren; back towards the foothills, vegetation covers the ground, and orchards and fields of grain vary the monotony.

The coast line is straight, and, in general, unbroken. Even the river mouths are choked with sand bars, much of the deposit being contributed by the Nile and brought from the southwest by along-shore currents. Artificial breakwaters and harbors have been attempted at Gaza, Jaffa, Acre, and Tyre, but they are either not adapted to the needs of modern commerce, or are wilfully neglected. It seems strange that people on such a forbidding coast, should have once risen to be the world's greatest navigators. This may be accounted for by the fact that Phoenicia is largely mountainous, so the people were forced to turn to the sea for a livelihood, and their small trading vessels did not require the deep, well protected harbors and facilities demanded by modern ocean-going steamers. It is a significant commentary on the character of the coast, that all European invading armies, including the one engaged in the present English campaign, have chosen to approach the interior of Palestine, by

the long arduous land route, rather than by water, or at least, not to attempt a sea attack until the interior was in their possession.

The Lebanon Range, with the exception of the diversion making Mt. Carmel, forms a continuous north-south ridge. From a height of seven thousand feet in the north, the altitude decreases to 2,800 in the plains of Galilee; the range disappears south of Beersheba but reappears in the outliers of Sinai on the Red Sea.

The break opposite Acre, making the Plain of Esdraelon, is the only large opening between the Jordan valley and the Mediterranean. The Lebanon Mountains, themselves, are mainly of limestone, with many caves, grottoes, and underground drainage channels. Both mountain flanks are cut by ravines, or wadys: short, straight, and deep on the east, where they descend to the Jordan; long, winding, and shallow on the west, where they seek the Mediterranean. The protection offered by the hills and mountains have made the Lebanon Range the site of many important cities, such as Beersheba and Jerusalem. Upon the crest of the ridge is the famous road of Israel, upon which prophets, kings, and pilgrims traveled to Jerusalem.

To the east of the mountain province, occurs another depression, quite different from the Coastal Plain. The latter is a gently sloping region, the former, a deep fissure, or graben, formed by the enclosure of a part of the ocean bed and a subsequent depression of the bottom. This remarkable rift valley begins at Antioch, to the north of Palestine, includes several rivers and lakes, among them the Jordan River and Dead Sea, passes through the Gulf of Akaba, and Red Sea, and, turning west at Aden, divides. Entering Africa, the west branch contains the African lakes, Rudolf, and Stephania; the south branch forms the great valley containing Albert Edward Nyanza, Tanganyika, and Nyassa. In the Dead Sea region, this fault block has dropped almost half a mile below the plateau. No other portion of the earth, not covered by water, is even three hundred feet below sea level. The trough has a width of from two to fifteen miles, and 160 miles of its length in Arabia are below sea level.

A large part of the valley, especially between Galilee and the Dead Sea, is very fertile, and all is capable of irrigation. The name Jordan, meaning "Down River," is given because of the swiftness of the current, which, near Galilee, has a fall of 40 feet per mile; the average fall between the Sea of Galilee and the Dead Sea is 9 feet per mile,—slightly more than the Colorado of the United States.

The valley is scantily populated, only one city, Jericho, being found in it. The intense summer heat renders it very unhealthful, and most of the people tilling its fertile soil, reside without the valley. The influence of the Jordan and its valley, has been chiefly that of a border and a barrier, rather than an agency promoting intercourse, as most valleys are.

In the matter of transportation, Palestine is served by a railway connecting with the famous Berlin-Bagdad line. Running southward from the junction at Aleppo to Damascus and Mecca, it skirts the western edge of the Syrian desert. South of Galilee a branch line crosses the Jordan valley and the Plain of Esdraelon, reaching the coast of Beirut. A second branch, running south from this line, through the Coastal Plain reaches Beersheba. Jerusalem has long been connected to its port, Jappa, by a short railroad.

The climate of Palestine is typically Mediterranean. The rainfall is light, decreasing from the sea eastward, Jerusalem receiving but twenty-three inches annually. The maximum fall occurs during the winter and early spring and high temperatures are the rule.

The soil is generally fertile, but production is limited by available water supply, and most of the cultivated crops require irrigation. The inner portion of the Coastal Plain, the Jordan Valley, and the portion of the Anti-Lebanons east of the Sea of Galilee, are practically the only parts cultivatable. The greater part of the remainder is covered with pasture in the spring, but is dry and parched through the summer.

Variations in altitude, rainfall, soil, and the presence of barriers, such as deserts and the Jordan Valley, have helped to make and keep Palestine a land of tribes rather than a united people.

Such conditions have made campaigning in this region a difficult problem. With England's life-line to India threatened by the Turks in their attack on the Suez in 1915, a campaign was planned to conquer Palestine and remove the menace. The expedition left the Suez in October, 1917. and, hugging the coast line, moved northward, Beersheba and Jerusalem being the innermost points reached. The troops chosen for this expedition were chiefly Indians and Australians, men accustomed to such a climate.

The coast line, as has been said, made a land invasion necessary, and Egypt was the logical base. For transportation, the camel was called in. Since 1914, the Egyptian Soudan had been sending camels to concentration camps in lower Egypt, where they were drafted for service, the best for "camelry," the others

for ordinary draft purposes. Lines of pipe for water conveyance, and a railroad built as the army advanced, were constructed. Geologists, familiar with the water bearing strata, aided in the location of wells, never once missing their estimated depth of drilling by more than fifty feet, so it is said. Pipe lines from these wells conveyed water to canvas troughs, supported by a double row of stakes. Tanks of water, resembling Prestolite gas tanks, were also strapped on camels and transported.

Much of the country traversed being flat, the fighting was in the open, the main marches were made at night, the men and animals seeking shelter in the wadys by day. The rainy season was late in starting, and the troops suffered greatly from heat, dust, and flies, before the rains brought relief.

After the capture of Gaza, some supplies were brought in by boat, as they were later at Jappa. But all material had to be landed by lighters and handled by hand. A "land ship," or tank, and aeroplanes, were used. The latter when bombing the Turkish positions at the north end of the Dead Sea were flying four hundred feet below sea level. Many of the Turkish positions were protected by the cacti hedges, which were more formidable than the barbed wire used on the western front.

Just a few days before Christmas came the announcement of the success of the campaign as registered by the capture of Jerusalem; Jerico was taken in February, and by this time the troops are well on their way to Damascus. After twelve and a half centuries of Mohammedan control, this land, of such peculiar interest to the followers of Christ, has again passed into Christian hands. Its possible disposition after the war becomes a matter of much speculation.

THE MAGNESITE INDUSTRY OF STEVENS COUNTY, WASHINGTON

By C. E. Cooper
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ACCORDING to Ries, the mineral magnesite is a carbonate of magnesium which contains 47.6% of magnesium. It occurs in veins or masses replacing other rocks rich in magnesium, and in two forms, either the dolomitic or the serpentine form.

The dolomitic is the more important form and the form which is least widely distributed. Up until the beginning of the present war, it was not known that this country possessed extensive deposits of this particular kind of magnesite. We had, previous to

the war, been importing dolomitic magnesite from Austria-Hungary where there are extensive deposits of it. It was brought to our country as ballast in trans-Atlantic vessels. Ries gives the following figures which will show how we depended upon Austria-Hungary for our supply, previous to the present struggle.

In 1913 the U. S. production of magnesite was 9,632 short tons.

In 1913 we imported from Austria-Hungary 163,715 short tons.

The chief use of the dolomitic form is in the making of refractory brick. Some is also used in the manufacture of toilet preparations, medicines, and when mixed with asbestos as a boiler covering. The demand for magnesite increased rapidly with the extension of the steel industry, since it is used in the lining of the furnaces of the steel works. Therefore when the supply from Austria-Hungary was shut off, the manufacturers of armor-plate, naval and other guns, railroad materials, and structural steel were threatened. It became necessary to locate a large available supply without loss of time.

The discovery of the Stevens County deposits may be attributed to Mr. R. S. Talbot of Spokane. The deposit lies in Stevens County near the towns of Chewelah and Valley about 60 miles north of Spokane and in the Huckleberry Mountains. It is a veritable mountain of magnesite and an engineer who has made a survey of one deposit says that at least four million tons of ore are in sight. The mines have been so prosperous that one of the large companies which has been operating just a year has declared a dividend of $30,000.

Over a million dollars is invested by four companies in this field and 350 men are employed in the mining of the ore. The ore is blasted from the mountain side and the broken rock is loaded into auto trucks and wagons and hauled to the railroad. This feature of the work will soon be a thing of the past for a railroad has been built from the mines to Valley where it connects with the Great Northern. About 1000 tons of the crude ore is removed from all the mines in one day. Approximately 75% of it is calcined near the mines and the rest is shipped in the crude form. The calcined mineral brings over four times as much as the crude product and it is only a question of a short time when all of the output will be in the calcined form. Kilns which will produce 300 tons of the calcined magnesite daily are in process of construction. Wood and coal are used chiefly in calcining the ore and after this process is completed the product looks like a whiteish-yellow limestone. It is shipped in paper lined cars to the great eastern steel plants.

FUR SEALS AND THE FUR SEAL FISHERIES

Distribution

THE fur seal formerly had a wide distribution over the earth. In the eighteenth century there was considerable fur sealing in the Antarctic region about the southern shores of South Africa, Australia, and New Zealand. In thirty years, however, the wasteful methods of sealing nearly exhausted this supply. Only very recently have the islands south of Cape Town been protected; the production, though small, increased from 1300 skins to 13,600 between 1902 and 1908. At one time there was a herd of fur seals on the Galapagos Islands which lie in the Pacific west of Equador, but by successive raids these also have been nearly exterminated. Uruguay, by her wise management of sealing on some of her small islands, shows what can be done in a small but profitable way; in 1901 she obtained 13,000 skins worth $100,000 from one island. These islands of the southern hemisphere, however, are of little commercial importance. A few islands in the north Pacific are the center of the fur sealing industry.

Herding

There are three distinct herds in the north Pacific. One small herd breeds on Robben Island, near Japan, and belongs to that country; another breeds on the Commander Islands in the Bering Sea near the peninsula of Kamchatka, and belongs to Russia; the third and largest herd breeds on the Pribilof Islands in the eastern part of Bering Sea and is owned by the United States. The seals of these three herds do not mingle since they are of different species. The seals which are born on the Pribilof Islands return to these islands to breed. The seals from the Russian islands migrate south along the Asiatic coast and those from the Pribilof Islands migrate along the American coast.

The fur seal is to be distinguished from the hair seal which we see in our harbors. Since the fur seal is very skillful on land, it is sometimes called the sea bear. The terms used for a seal community are rather incongruous, although they apply very well in the separate cases. The mature male is called the bull because he is so large. The mature female, or cow, is small and timid, weighing about 75 pounds. The offspring is called a pup because of its playfulness. The immature males are termed bachelors; they live separate from the other seals on the hauling grounds. The assemblage of cows numbering from a few to a hundred to which a male has attached himself is called a harem. A succession of harems on a beach form a rookery and all the seals together make up a herd.

During the winter months, the fur seals are at sea. Early in the spring, beginning with April and extending into early June, the males migrate north to their rookeries. At this time the bull has a fine fur coat, is fat and muscular, and weighs about 400 pounds. As "beachmaster" he is prepared to protect his section of the beach against all strangers. He is especially dangerous at this time and will attack man or beast. The cows come to the rookeries during June and July, select their mates and assemble in harems; the pups when born weigh about 11 pounds. Since there is no food within many miles of the Pribilof Islands, the mother seals must swim from 50 to 100 miles to get food. During their absence of a day or two, the pups have nothing to eat, but when the mothers return, the pups gorge themselves. The bull eats nothing during the breeding season; that is, from April or May till August. The pups congregate in pods where they are somewhat protected from the belligerent males, and here they play together like puppies.

The bachelors, congregated on their hauling grounds, live a rather uneventful life. They are prohibited from entering the breeding grounds, and must even have a separate outlet to the ocean. The bachelors, when three years old, have the best fur. Since the seal is polygamous, a large number of the bachelors can be killed when their fur is at its prime, without impairing the development of the herd. They mature at the age of six and live to the age of twelve or fourteen years.

The bulls are the first to start the winter migration. After four months of fasting and fighting, they become weak and thin. By the end of November, the islands are practically deserted. The pups, now weighing about 50 pounds, leave for their first migration. The next year they return to the hauling grounds as bachelors or to the breeding grounds as immature females to play with the pups.

Legislation

. The Pribilof Islands with the valuable herd of seals came into the possession of the United States in 1867 when we bought them from Russia. Before that time, when the Russian American Company monopolized the industry, the fur sealing was carried on indiscriminately. When we purchased the islands, there were 3,000,000 to 4,000,000 seals. Through mismanagement and international complications, the herd was reduced to 150,000 by 1911. This was caused partly by careless and greedy killing of the seals on the islands. Between 1867 and 1910, 2,500,000 skins were taken from the islands. The second and greatest cause was pelagic sealing, or killing the seals at sea. The great loss comes from the

fact that during the warm months the males are on the islands and the females are going back and forth for food. From 70 to 90 per cent of the seals killed at sea were females. Every female killed in this way causes the death of a pup either born or unborn. The Japanese, Russian, and Canadian seal hunters were thus reducing our herd by the thousands.

This necessitated long and laborious arbitration at Paris between Great Britain and the United States. In 1894 it was finally decided to prohibit pelagic sealing within 60 miles of the islands between May 1st and July 1st. The number of seals, however, kept decreasing since Japan and Russia still continued the practice of pelagic sealing. At last, in 1911, all four countries agreed to abolish all such sealing for 15 years. The herd had been reduced so greatly during this time that the United States Government found it necessary to pass a law prohibiting all sealing on the Pribilof Islands until 1917. Since 1912 the herd has shown signs of rapid recuperation.

In 1912 the first reliable enumeration or census of the seals was taken; only estimates had been made up to this time. Figures for bachelors and immature females are not available. In this year there were 164,000 pups and females and 1,360 bulls. By the discontinuance of land sealing for five years and by the prohibiting of pelagic sealing, the numbers increased to 234,000 pups and females and 3,500 bulls in 1916. If no bulls are killed, however, the number will not increase because the excess number of idle, fighting males kills off many of the pups. Beginning with 1917, therefore, the killing of bachelors has been resumed. Until 1926, 5,000 3-year-old males are to be reserved annually. Since the seals are polygamous, it is necessary to retain only one male for about twenty cows. The best method, therefore, of developing the herd is to kill proportionally at all times. This would permit the killing of a large number of the best seals in their prime without checking the increase of the herd.

FLORENCE WHITBECK.

"I pronounce literature the most important of all branches of school education whether it be in China....or East India....or among the Mohammedan nations or in Greece....or in the schools of Boston, New York, St. Louis, and San Francisco....After literature comes geography, meaning by that term what is usually understood by it in the elementary school. After geography comes history.... after history, grammar.

[*Dr. Harris, Forum*, 32:540, 1902.]

A LAUDABLE UNDERTAKING IN GEOGRAPHY

WE have recently received a copy of a 200-page book on the subject "Bay County Past and Present." The Bay county referred to is the county containing Bay City, Michigan. The Superintendent of Schools and certain teachers of the city became convinced that if geography were to be taught effectively in their city local material ought to be brought together for the assistance of the teachers. Principal George E. Butterfield of the McKinley School, with the assistance of the teachers and pupils of the 6th grade geography classes, undertook the preparation of a geography of the local region. The book is more than a geography since it deals with the history and government of the city and county as well as with things that are strictly geographical. The book is excellently illustrated, completely indexed, strongly bound and well printed. It reflects much credit upon those who accomplished the task. We believe that this is just the thing that ought to be done in every city. It has long been our conviction that while general text books of geography are desirable, yet every city should have available for its teachers a published local geography. There is no way of making the geography of distant places and countries so effective as by basing it on well worked-out local studies. Home geography should not be confined to the first year, but type studies in the home region should be a part of the entire course of grade school geography. We think our readers will be interested in the following explanation which appears in the introduction of this local geography of Bay County, Michigan:

"When such a study of Bay County was undertaken two years ago at the request of Superintendent Gause, it was found to be very difficult to get suitable material on the many topics. In some schools there was very little material to be found, because the parents were mostly recent immigrants. In other schools there was a wealth of material to be obtained directly from the pioneers, but there was no way in which this material could be given to the other schools or could be preserved for future classes. The libraries contain much valuable material, but not in a form suitable for use by sixth grade pupils.

"To overcome these difficulties, Mr. Gause suggested that the geography department, with the pupils of the sixth grade, make a detailed study of the county for one year. This would give the pupils an important piece of constructive work to do, and the results could then be published as a text book for use in future classes.

"The method of procedure has been as follows: The sixth grade teachers of geography met at frequent intervals to discuss the work, the sources of material, and to form general outlines for the classes to follow. Beginning in January, 1917, and continuing through May, pupil representatives from each sixth grade in the city met for an hour once a week with the chairman to present reports from their classes, discuss various parts of the work, and decide questions that had arisen By the close of the school year in June, reports of the work of each class had been handed in to the chairman. These reports were sifted, conflicting statements investigated, and sources of all kinds consulted. Many of the pioneer residents were interviewed. Then the work was put in final form for publication.

"It has been our object to have an interesting book. This accounts for many of the stories and illustrations. At the same time we have attempted to make the work as reliable as possible and to record the sources of our information. Lack of time has made it impossible to go to the real sources in many cases.

"We have aimed to place the emphasis on those phases of the work that are significant, but are not at hand for study now. The present industrial and governmental conditions need no text for their study—in fact, ought to have none. The daily paper with its advertisements, statements about business and the industries, and with its proceedings of the Common Council, Board of Education, Board of Supervisors, and of other governmental bodies of the city and county furnish text enough for this part of the work. At the same time it is desired that the personal observation of the pupil be used wherever possible. This can be accomplished by means of individual, group or class excursions and visits to interesting places, to industrial plants, and to the meetings of the Common Council, etc.

"Many suggestions and much valuable information have been received from individual citizens, city and county officials, and the libraries. Many valuable illustrations have been donated at considerable expense by several of our factories and by individuals interested in the success of the book."

A copy of the book may be secured by sending $1.00 to the Board of Education, Bay City, Mich.

THE PROGRESS OF SHIP BUILDING IN THE UNITED STATES

(Extracts from an address by Chairman Hurley of the U. S. Shipping Board in New York, March 26.)

THERE were 37 steel shipyards in America at the time of our entrance into the war. We have located 81 additional steel and wood yards, while 18 other yards have been expanded. Does America realize what this job means? Does it realize what a tribute is paid to its own initiative in this achievement?

We are building in the new and expanded steel yards 235 new steel shipways, or 26 more than at present exist in all the shipyards of England. If we had been content with doing the job in a small way, we might have built a few new yards, and added a little to our capacity. A few ships might have been finished more quickly; but it was the spirit and will of America to do the job in a big way, and the judgment of the country will be vindicated by the results when all these new ways are completed and are turning out ships. Many of these ways have actually been finished. The new industry we have created will make America the greatest maritime nation in the history of the world.

It has been an uphill struggle. I am willing to confess there have been times when we have been discouraged, not at the magnitude of the task, but through a doubt of human ability to accomplish the stupendous work in the short time allowed.

But we have had our moments of elation when we have felt that we were making progress. The record made by the Skinner & Eddy Co., of Seattle, is a case in point. That company laid the keel for an 8,800-ton vessel, which was launched in 64 days. She was delivered to the Fleet Corporation on January 5, and started on the first voyage on January 14. This record accomplishment shows what can be done in live, wide-awake efficient American shipyards.

Then a few days ago we received a telegram from the Moore Shipbuilding Co., of Oakland, Cal., announcing the successful launching of one of their large vessels. Twenty minutes later we received another telegram from the same company announcing the launching of a second ship of the same type, and 40 minutes afterwards a third telegram saying that a third vessel of similar character had gone overboard.

Steel Construction Tonnage.

The total amount of our steel construction program on March 1 was 8,205,708 dead-weight tons. This is made up of 5,160,3

dead-weight tons under contract with the Emergency Fleet Corporation, and 3,045,408 dead-weight tons of requisition vessels.

Of this total steel construction, 2,121,568 dead-weight tons, or approximately 28 per cent, has been completed. Of the amount of steel ships under contract and under requisition, 655,456 dead-weight tons, or approximately 8 per cent, were actually completed and in service on March 1 of this year, nearly a month ago. This amount of floating tonnage exceeds our total output in 1916, including steel, wooden, and sailing vessels, by approximately 50 per cent.

In the yards which we have already completed and those which are nearing completion the progress will be cumulative from this time on.

Thus, while we have been building the yards and training the new forces necessary to construction, we have also been building the ships.

Notwithstanding the difficulties of organization, of the handicaps of bad weather conditions, of transportation embargoes and railroad congestion, nearly as much tonnage has been constructed in American waters in the past three months as by all the other maritime nations of the world combined.

I have refered to the necessity of providing additional facilities for the building of ships. That is, for the creation of new shipyards, for enlarging old ones, for the education of new shipbuilders, and, I may now add, the necssity of providing increased means for obtaining engines, boilers, turbines, and other equipment. At the outset the 37 old steel yards began increasing their capacity until they now have 195 ways as against 162 eight months ago. Thirty additional new steel shipyards are thus being erected, with a total of 203 shipbuilding ways. Thus we now have in the aggregate 67 steel shipyards either wholly or partly engaged in Fleet Corporation work. These yards will have a total of 398 steel building ways. Of these, 35 yards, with 258 ways, are on the Atlantic and Gulf coast; 19 yards, with 66 ways, are on the Pacific; while 13 yards, with 74 ways, are on the Great Lakes.

A year ago wooden shipbuilding in the United States was almost a lost art. We found 24 old wooden shipyards with 73 shipways. The capacity for wooden shipbuilding has been increased until we now have 81 wooden shipbuilding yards, with 332 ways completed or nearing completion.

Assuming that these ways will each produce two standard ships per year, we should turn out about 2,300,000 dead-weight tons of wooden ships annually. These 332 wooden shipbuilding ways, now nearing completion, added to our 398 steel building

ways, will give us a total of 730 berths upon which to build steel and wooden vessels. When you consider that we had only 162 steel building ways a few months ago and 73 wooden shipbuilding ways—a total of 235—an increase is shown of 495 wooden and steel berths on which we can build ships.

The proposal to build ships of concrete was first regarded as a fascinating absurdity. On March 14 there was launched from the yards of the San Francisco Co. the first concrete steamship, a vessel which the builders christened *Faith*. We hope she will exemplify her name.

SINGAPORE

SINGAPORE is a city of a quarter of a million people, pleasantly stretched out for four miles of sea-front on an island that tips the southern end of the Malay Peninsula. There is no other city like Singapore in the whole world.

In the first place, it is the only city of size and importance near the Equator. Singapore lies practically right upon the Line, being only a little over one degree North. It is a very busy, ambitious, thriving center of industry and commerce.

It is one of England's most strategically located military and commercial outposts. In the inter-Imperial plan of future Britain, it is receiving especial consideration because it commands, in matters of strategy, commerce and transportation, the highways between the Orient and the West by way of the Indian Ocean. It has already been provided with a great graving dock big enough to float the biggest steamships, and so qualifies for a place in the projected line of ports connecting the different parts of the British Empire which the Dominions Royal Commission has recommended for special port development in order to make possible the establishment of several world-traversing routes for big ships under Government control, the economies of transportation to take the place of tariff-protection as an economic means of favoring Empire production and commerce. A radio-station with capacity for sending messages to London is planned for Singapore. There are now five submarine cables centering there. It is provided with a strong unit in the chain of fortresses from Portsmouth to Hong Kong.

And it is a commercial *entrepot* market of rapidly growing importance. In 1913, 12,182 ships in overseas trade entered and cleared at Singapore, representing a tonnage of 17,254,953. In 1914 the overseas and local East Indian shipping of all kinds totaled 37,203 with a tonnage of 18,509,668, as if every third ship in the world had made one voyage to Singapore.

Singapore and Hong Kong are both trading markets somewhat artificially established by England in the Far East. To Singapore's harbor, where the ships of all nations gather, have come the spices, the cocoa and copra, the rich vegetable oils, typical products of the ancient Ind, for many years. And, in a decade, there has grown up an enormous export to the West of the rubber coming from the new plantations that are now supplying the world. This, added to the tin, which for several decades has come out of the Straits mines in growing quantities, till now it fills more than half the world's necessities, gives an industrial background to the trade of Singapore and other Straits ports which are commercially tributary to Singapore. In the reverse direction Singapore increasingly is becoming the distributing center of a growing trade in the manufactures of Europe and America. It is a cosmopolitan market, a "free port," and the commercial facilities are at the disposal of the whole world.

Almost as striking as the display of British genius for going to the far ends of the world and doing things, seen at Singapore, is the Chinese capability for enterprise, in a big way, in a foreign land, which one sees everywhere in the Malay Peninsula and the East Indies. [Excerpted from THE AMERICAS, Dec. 1917.]

Professor S. S. Visher, formerly head of the Department of Geography of the State Normal School at Moorehead, Minnesota, has been appointed a member of the Land Classification Service of the United States Geological Survey, and has entered upon his work in certain of the semi-arid regions of the west.

Professor W. R. McConnell of the Geography Department of the Platteville, Wis., Normal School, has been elected head of the Department of Geography in the Teachers Training College, Miami University, Ohio.

Professor E. G. Lange of the Geography Department of the Whitewater Normal School, Wis., has resigned to enter army Y. M. C. A. work.

The Report on Geography to the New England Association of School Superintendents (1901) *says*

"As a source of information valuable in itself and not merely as an instrument, it has no equal among its associated subjects."

"Geography better than other school subjects leads us to a recognition not only of our place in the world, but of our part in its life."

SOUTH AMERICAN NOTES

(Clipped from *The South American* and from *The Americas*)

Great Increase in Latin American Trade

TRADE between the United States and South America is three times as great as in the year before the war.

To Argentina, Chile and Peru the exports have more than trebled; and to Uruguay quadrupled; while to Brazil, Colombia, Ecuador and Venezuela the exports are nearly three times as great as in 1914. To Argentina the total for the eight months ended with August, 1917, is $62,256,000, against $19,649,000 in the same months of 1914; to Brazil $40,157,000, against $15,973,000; to Chile $32,971,000, against $10,800,000 in the corresponding months of 1914.

Imports from each of the South American countries show large increases, but especially those from Argentina, Uruguay, Chile and Peru.

The share which the United States is now supplying of the trade of South America is very much greater than before the war. Merchandise from the United States formed about 30 per cent. of the imports of all South America in 1916 while in 1913 we supplied but 15 per cent of the total imports of that continent. The United States took in the calendar year 1916 approximately 30 per cent. of the exports of South America and in 1913 but 17 per cent.

Manufactures form more than 90 per cent. of our exports to South America and in practically all of these the increase is strongly marked.

Growth of Manufacturing in Brazil

A continuation of the war is likely to result in important developments as regards the manufacture in Brazil of ammunition and other war material, a good deal of which is already being made in the country. The successful manufacture from Brazilian iron ore of high grade steel demonstrates the possibilities of Brazil in this respect, and with the impulse afforded by the difficulties attending the importation of metal products from the belligerents, it is possible that the iron industry in Brazil will become a reality many years sooner than would have been the case if there had been no war. The iron deposits of Brazil are among the largest in the world, but they have hitherto remained dormant owing to their distance from the coal beds, and at the same time owing to the heavy competition offered in the iron markets of the world by pig iron, which has been transported at

low freight rates. There is fresh activity at the iron works of Ipanema, in the State of Sao Paulo (the property of the Government), which has a production of three tons of iron per day. The ore in this section is magnetite, or magnetic oxide of iron, the ore of which gives up to 67 per cent metal; the district has an immense supply of iron and lime within a short distance of the factory. In addition to this, it is announced that the Esperanca iron works at Itabira do Campo, in the State of Minas Geraes, has started another smelter for the production of pig iron, in addition to those already existing there.

A Bumper Coffee Crop for Brazil

All forecasts of the Brazilian Coffee crop for this season agree that it will be very large, and likely, according to some authorities, to beat the record. Santos may export 12,000,000 bags and Rio 5,000,000, both of which figures have been beaten only once before, while Victoria is expected to furnish over a million bags, which is far more than the total for any previous year. Estimates for Bahia and from the less important coffee districts of Parana and the northern states are not available, which is unfortunate, as the forecast of a record crop must evidently have been based upon surprises elsewhere than in Rio and Santos.

The following are the number of bags exported in different years since the beginning of the century from the two principal Brazilian ports of Rio de Janeiro and Santos, and also the total from all ports. These figures are kindly furnished by the New York Coffee and Sugar Exchange, and show very graphically the proportion of the world's coffee which comes through these two Brazilian ports.

Season	World's Crops	Bags Exported From Rio	Santos
1900-1901	15,100,000	2,939,000	7,988,000
1905-1906	14,792,000	3,244,000	6,983,000
1910-1911	14,524,000	2,438,000	8,110,000
1911-1912	17,409,000	2,497,000	9,994,000
1912-1913	16,373,000	2,894,000	8,564,000
1913-1914	19,612,000	2,961,000	10,855,000
1914-1915	17,886,000	2,344,000	9,523,000
1915-1916	19,756,000	3,248,000	11,744,000
1916-1917	16,691,000	1,309,000	9,803,000

COLLEGE STUDENTS' IGNORANCE OF GEOGRAPHY IN 1857

THE following extract from the autobiography of ex-President Andrew D. White of Cornell University is reproduced in Professor O. D. von Engeln's new book, "Concerning Cornell." This is what President White says of his students in the University of Michigan in 1857.

"On arriving at the University of Michigan in October, 1857, I took especial charge of the sophomore class. Among my duties was their examination in modern geography as a preliminary to their admission to my course in history, and I soon discovered a serious weakness in the public-school system. In her preparatory schools the state of Michigan took especial pride, but certainly at that time they were far below their reputation. If any subject was supposed to be thoroughly taught in them it was geography, but I soon found that in the great majority of my students there was not a trace of real knowledge of physical geography and very little of political. With this state of things I at once grappled, and immediately "conditioned" in these studies about nine-tenths of the entering class. At first there were many protests; but I said to my ingenuous youths that no pedantic study was needed, that all I required was a preparation such as would enable any one of them to read intelligently his morning newspaper, and to this end I advised each one of them to accept his conditions, to abjure all learning by rote from text-books, to take up simply any convenient atlas which came to hand, studying first the map of our own country, with its main divisions, physical and political, its water communications, trend of coasts, spurring of mountains, position of leading cities, etc., and then to do the same thing with each of the leading countries of Europe, and finally with the other main divisions of the world. To stimulate their interest and show them what was meant, I gave a short course of lectures on physical geography, showing some of its more striking effects on history; then another course on political geography, with a similar purpose; and finally notified my young men that they were admitted to my classes in history only under condition that, six weeks later, they should pass an examination in geography, full, satisfactory, and final. The young fellows now took their conditions very kindly, for they clearly saw the justice of them. One young man said to me: "Professor, you are entirely right in conditioning me, but I was never so surprised in my life; if there was anything that I supposed I knew well it was geography; why, I have taught it, and very successfully, in a large public school." On my asking him how he taught a subject in which he was so

deficient, he answered that he had taught his pupils to 'sing' it. I replied that if he would sing the answers to my questions, I would admit him at once; but this he declined, saying that he much preferred to accept the conditions. In about six weeks I held the final examinations, and their success amazed us all. Not a man failed, and some really distinguished themselves. They had all gone to work cordially and heartily, arranging themselves in squads and clubs for mutual study and examination on each physical and political map; and it is certain that by this simple, commonsense method they learned more in six weeks than they had previously learned in years of plodding by rote, day after day, through text-books."

ACTIVITIES OF THE CONNECTICUT COUNCIL

THE Connecticut Council of Geography Teachers has recently held an interesting meeting at which the following program was presented:

Business meeting—

The constitution was adopted and the officers were elected.

Addresses—

Dr. Charles F. Brooks of Yale University, "This Old Fashioned Winter."

Mr. George B. Shaefer, Head of the Pedagogical Department and Director of the Practice School of the Bridgeport City Normal School, "The Problem Method of Teaching Geography in the Upper Grades."

Six new members were added to our Council, giving us an initial membership of fifty.

Other members were added to the National Council of Geography Teachers, so that we now have over fifty members in that Council.

Our constitution is based on that of the National Council. In it, Community Councils take the place of State Councils and Community Leaders take the place of State Directors. We hope to have many Community Councils formed and to get them to work up special phases of geography to present at our meetings.

The officers for the coming year are:

President, Charles E. Pratt, Head of Geography Department, State Normal School, New Britain.

Vice President to represent elementary schools, W. Jerold O'Neil, Principal Waterside School, Stamford, Conn.

Vice President to represent normal schools, high schools and colleges, George B. Shaefer, Head of Pedagogical Department and Director of the Practice Schools of Bridgeport City Normal School.

Secretary and Treasurer, Miss Ellen Murnane, Training Teacher in State Normal School, New Britain.

(Signed) Charles E. Pratt.

MEETING OF LOUISIANA GEOGRAPHY TEACHERS

THE geography section of the Louisiana Teachers Association met in Baton Rouge, April 5, with an attendance of 45. It was easily evident from the meeting that interest in both grade geography and high school physical and commercial geography is rapidly increasing in the state. Nearly every first class high school now offers physical geography. The following program was given with President Brassher of Alexandria presiding:

General Topic: HOW GEOGRAPHY HAS BEEN AFFECTED BY THE WAR.

How Geography May Promote International Good Will, Supt. C. C. Henson, Alexandria.

The Value of an Intensive Study of the Geographical Resources of Louisiana, President V. L. Roy, State Normal School.

Teaching in Geography Classes the Conservation of Fuel, Supt. J. T. Peters, Bogalusa.

Suggestive Changes in Geography Teaching as a Response to the Needs of the Present World Crisis

(a) *In Elementary Grades,* Supt. J. M. Gwinn, New Orleans.

(b) *In High Schools,* Mr. C. A. Ives, State High School Inspector.

Committees were appointed to consider and report on outlines for teaching the natural resources of Louisiana and also to prepare a list of the fundamental facts in world geography, the object being to decrease the number of unessential facts now commonly taught.

Dr. F. V. Emerson of the State University explained the purposes of the National Council of Geography Teachers and a number of teachers were enrolled.

The section will meet at New Orleans next year with the State Association. The following officers were elected for the ensuing year:

President, Supt. C. C. Henson, Alexandria.
Vice President, Miss Mabel Brassher, Alexandria.
Secretary, Miss Grace Moore, New Orleans.

RECENT PUBLICATIONS

"The Nation's Business"—A Review

As the title indicates, the magazine treats the big issues in the nation's affairs from the business point of view. Those factors affecting the welfare of the country, be they of local origin or of foreign cause, are discussed thoroughly and in a very illuminating manner. Although many of the contributions are not by authorities but by men appointed to make special investigations, a very large number of the articles are authoritative. Those resulting from special inquiry are quite as reliable.

The editors of the magazine are "free lances." They have but one obligation, namely, to supply clear-cut, accurate, up-to-the-minute information relative to America's business, to the business man. The magazine is published without profit. It is simply the organ of expression of the Chamber of Commerce of the United States, an organization composed of hundreds of Chambers of Commerce and of individual business firms throughout the country. These facts are cited not to advertise the periodical merely for purposes of increasing its subscription list, but just to show why Geography teachers and students can have the utmost confidence in its contents.

A few of the titles appearing in the numbers for 1917 will give some idea of the scope of the work so far as concerns the Geography teacher and student:—

- The Potato Crop in the U. S.
- New Crops Wait on Rain, and Business on Both—with a map of business conditions
- For and Against Daylight Saving
- Commercial Courses in Colleges—by several University Presidents
- Russian Needs During and After the War
- Panama Canal Begins to Pay
- Development of Railways, Waterways and Highways
- Shipbuilding Conditions in the U. S.
- Foreign Trade of the U. S.
- Our Job in Porto Rico.

These are but 10 out of no less than 72 attractively written articles of especial interest to the Geographer. Most of them are strikingly illustrated. The style of language is popular and pointed; in some respects it is unique.

For an exposition of *dynamic* Commercial and Economic Geography this journal stands alone. It fits in beautifully with the several magazines devoted to Geography only. It neither

displaces any of the present Geographical publications nor duplicates them. The writer of this review has found it most helpful in many respects and recommends the magazine with a free conscience. Eugene Van Cleef.

PAZ AND PABLO, A STORY OF TWO LITTLE FILIPINOS, by Addie F. Mitchell. The first volume in the series of Children of the World. Price 48 cents. World Book Company, Publishers, Yonkers-on-Hudson, New York.

This little book, which begins a new series for young readers, is designed to open up to them the study of geography and history as living subjects.

Paz (Peace), the little girl, and her brother, Pablo (Paul), are real children; they and their baby sister do all the things which Philippine children do and what they do is told so interestingly that American boys and girls in grades three to five will be anxious to know more about them. The author tells of conditions of living and the customs of the people in our largest island possession.

GEOGRAPHIC FACTORS IN AMERICAN HISTORY. By H. A. Bone. 83 pp. Print Shop: *Ye Highe School,* Sioux City, Iowa, 1917.

This is a laboratory manual to be studied in connection with a course in United States history and deserves a place on the desk of teachers of American history. It contains thirty-seven outlines with suggestions for the study of geographic conditions relating to various topics in history. The "problem" method is used throughout and for this the author is to be commended. These "problems" are based largely on Semple's "American History and Its Geographic Conditions" but many other books are cited for reference. Although the outlines are written primarily for the teacher of history there are many valuable suggestions for the teacher of geography especially if the latter is interested in the "human side." F. E. WILLIAMS.

The 1917 report of the American Sugar Refining Company of New York contains much of interest to the geography teacher. A brief discussion of the sugar situation during the past year, supplemented by graphs, maps and charts, gives up-to-the-minute information regarding this important commodity.

NOTICE—A GEOGRAPHICAL DIRECTORY

WE purpose to make the June number of the Journal of Geo raphy a Geographical Directory. It will be one of the mc useful special numbers we have ever issued, a hand book of i formation to which teachers will refer again and again.

Heretofore we have printed from 500 to 5000 addition copies of our special issues and have seldom had enough to 1 the orders that continued to come in. The following Table Contents will give an idea of what it is proposed to include the Geographical Directory.

PROPOSED CONTENTS OF THE JUNE ISSUE

Best books on the Teaching of Geography.

Selected Reference Books for Geography Teachers.

Modern text books in Elementary, Physical, Commerci General, and College Geography.

Books for supplementary reading and reference in tl grades and in the high school.

List of atlases, gazetteers and annuals.

Directory of map publishers, lantern slide makers, aı dealers in other geographical materials.

Information about maps and other publications of value geography teachers furnished free or at a small cost by the U. government.

A list of magazines which regularly print articles of geogr phic interest.

British and American Geographical Societies and the ge graphical magazines published in the English language.

A complete list of articles on the Teaching of Geograpl found in back numbers of the leading educational magazines.

Other Bibliographies.

A REQUEST

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The JOURNAL *of* GEOGRAPHY

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A LIST OF 120 SELECTED ARTICLES ON GEOGRAPHY IN SCHOOLS AND COLLEGES

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MODERN TEXT BOOKS AND REFERENCE BOOKS

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First Book $.72. *Second Book* $1.24.
The American Book Co., New York.

Dodge, Richard E. *Geographical Series.* 1904.
Elementary Geography $.65. Advanced Geography $1.20.
By Grades: *Book One* $.35. Book Two $.50. Book Three $.75. *Book Four* $.70.
Rand McNally and Co., Chicago.

Frye, Alexis E. *Geographies.*
New Geography, Book I, 1917, $.88.
New Geography, Book II, in preparation.
Grammar School Geography, 1902, $1.25. Same in two volumes $.80 each.
Leading Facts of Geography, one volume, $1.10. Same in two volumes: Book I, $.60; Book II, $1.00.
Home Geography and Type Studies. $.36.
First Steps in Geography. $.65. Same in two vols. $.45 each.
Elements of Geography, $.65.
Home and School Atlas, 24 pages of maps, $1.00.
Ginn and Co., Boston.

King, Charles F. Geographies.
Elementary Geography, 1904, $.65.
Advanced Geography, 1906, $1.25.
Charles Scribner's Sons, New York.

Morton, Eliza H. Geographies. 1901.
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Advanced Geography, $1.20.
American Book Co., New York.

Niver, Harmon B. Geographies.
Elementary Geography, 1915, $.85. Also bound in two parts, $.60 each.
Advanced Geography, 1916, $1.35. Also bound in two parts, $.85 each.
Hinds, Hayden and Eldredge, Inc., New York.

Redway and Hinman. Natural Geographies. 1898, 1901.
Introductory Geography, $.60. Also in two parts, $.40 each.
School Geography, $1.25. Also in two parts, $.75 each.
Atlas of Reference Maps from School Geography, $.35.
Elementary Geography, $.60.
Advanced Geography, $1.25.

Brief Geography—One-book course, $.80.
American Book Co., New York.

Roddy, H. Justin. Geographies. 1902.
Elementary Geography, $.50.
Complete Geography, $1.00.
American Book Co., New York.

Tarr and McMurry. New Geographies. 1910.
First Book, complete, $.65. Second Book, complete, $1.10.
First Book, Part I, $.40. Second Book, Part 1, $.65.
First Book, Part II, $.50. Second Book, Part II, $.65.
World Geography, one volume, $1.25.
The Macmillan Co., New York.

HIGH SCHOOL TEXT BOOKS—COMMERCIAL.

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Salisbury, Barrows and Tower. Modern Geography. Holt, N. Y., 1913. $1.25.

——Elements of Geography. Holt, 1912. $1.50.

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Archer, Lewis and Chapman. Teaching of Geography in Elementary Schools. Macmillan, 1910. $1.10.

Redway, J. W. The New Basis of Geography. Macmillan, 1901. $1.00.

Sutherland, W. J. The Teaching of Geography. Scott, Foresman & Co., Chgo., 1909. $1.25.

McMurray, Charles A. Special Method in Geography. Macmillan, 1903. $.70.

Holtz, F. L. Principles and Methods of Teaching Geography. Macmillan, 1913. $1.10.

Geikie, A. The Teaching of Geography. Macmillan, 1906. $.60.

Dodge, Richard E. and Kirchwey, Clara B. The Teaching of Geography in Elementary Schools. Rand McNally & Co., Chgo., 1913. $1.00.

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Ward, R. DeC. Climate. G. P. Putnam's Sons, N. Y., 1908. $2.00.

——Practical Exercises in Elementary Meteorology. Ginn & Co., Boston, 1899. $1.12.

Milham, W. I. Meteorology. Macmillan, 1912. $4.50.

Davis, W. M. Elementary Meteorology. Ginn & Co., Boston, 1894. $2.50.

Waldo, Frank. Elementary Meteorology, Am. Bk. Co., N. Y., 1896. $1.50.

COLLEGE TEXTS AND HIGH SCHOOL LIBRARY REFERENCE BOOKS.

Bowman, Isaiah. Forest Physiography. (A Physiography of the United States.) John Wiley & Sons, N. Y., 1911. $5.00.

Chisholm, George G. Handbook of Commercial Geography. (Standard reference work.) Longmans Green & Co., N. Y., 1900, 1911. $4.80.

Davis, W. M. Geographical Essays. Ginn and Co., Boston, 1909. $2.75.

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George, H. B. Relations of Geography and History. Oxford Uni. Press, N. Y. $1.10.

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Semple, Ellen C. American History and its Geographic Conditions. Houghton Mifflin & Co., Boston, 1903. Student's Edition $1.60 net.

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Murray, Sir John. The Ocean. Henry Holt & Co., N. Y., 1913. $.50.

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Pirsson, L. V. Rocks and Rock Minerals. John Wiley & Sons, N. Y., 1908. $2.50.

Russell, I. C. Glaciers of North America. Ginn & Co., Boston, 1897. $2.10.

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——Rivers of North America. G. P. Putnam's Sons, N. Y., 1898. $2.00.

——Volcanoes of North America. Macmillan, 1897. $4.00.

Shaler, N. S. Aspects of the Earth. Charles Scribners' Sons, N. Y., 1889. $2.50.

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Toothaker, Chas. R. Commercial Raw Materials. Ginn & Co., Boston, 1905. $1.25.

Van Hise, Chas. R. The Conservation of Natural Resources in the United States. Macmillan, 1910. $2.00.

SUPPLEMENTARY BOOKS—COMMERCIAL AND INDUSTRIAL

Burkett, C. W., and Poe, C. H. Cotton. Doubleday, 1906. $2.00.

Butler, F. O. Story of Paper Making. Butler Paper Co., 1901. $.75.

Cochrane, C. H. Modern Industrial Progress. Lippincott, 1904. $3.00.

Dondlinger, P. T. The Book of Wheat. Judd, 1908. $2.00.

Bengtson & Griffith. The Wheat Industry. Macmillan, 1915. $.65.

Doubleday, Russell. Stories of Inventors. Doubleday, 1911. $1.25.

Edgar, W. C. Story of a Grain of Wheat. Appleton, 1905. $1.00.

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Hoskin, A. J. The Business of Mining. Lippincott, 1912. $1.50.

Lyde, L. W. Man and His Markets. Macmillan, 1902. $.50.

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Meade, E. S. The Story of Gold. Appleton, 1908. $.75.

Meldola, Raphael. Coal and What We Get from It. Gorham, 1891. $.85.

Mills, J. C. Searchlights on Some American Industries. McClurg, 1911. $1.50.

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Smith, J. R. The Story of Iron and Steel. Appleton, 1908. $.75.
Surface, G. T. The Story of Sugar. Appleton, 1910. $1.00.
Tower, W. S. The Story of Oil. Appleton, 1909. $1.00.
Brooks, E. C. The Story of Cotton. Rand, McNally, 1911. $.75.
Wilkinson, Frederick. Story of the Cotton Plant. Appleton, 1899. $.35.
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Ashley, W. J. British Dominions. Longmans, 1911. $1.80.
Forbes-Lindsay. Panama and the Canal Today. Page, 1912. $3.00.
Hogarth, D. G. The Nearer East. Appleton, 1902. $2.00.
Maclain, J. S. Alaska and the Klondike. Doubleday, 1905. $2.00.
Smythe, W. E. Conquest of Arid America. Macmillan, 1907. $1.50.
Casson, H. N. Romance of Steel. A. S. Barnes & Co., 1907. $2.50.
Wilkinson, J. W. Practical Agriculture. Am. Book Co., 1909. $1.00.
Thompson, Holland. From Cotton Field to Cotton Mill. Macmillan Co., 1906. $1.50.
Greene, Homer. Coal and Coal Mines. Houghton, Mifflin. $.75.
Casson, H. N. Romance of the Reaper. Doubleday, 1908. $1.20.
Shinn, C. H. Story of the Mine. Appleton. $1.50.
Bowman & Crossley. Corn. Bowman & Crossley, Ames, Ia., 1908. $2.00.
Carter, C. F. When Railroads Were New. Henry Holt, 1909. $2.00.
Spearman, F. H. The Startegy of the Great Railroads. Scribners, 1904. $1.50.
Hopkins, C. G. Soil Fertility and Permanent Agriculture. Ginn & Co., 1910. $2.25.
Mills, J. C. Searchlights of American Industries. McClurg, 1911. $1.50.
Johnson, E. R. Ocean and Inland Water Transportation. Appleton, 1906. $1.50.
Kinney and Cooley. Shelter and Clothing. Macmillan, 1913. $1.10.
Crissey, Forrest. The Story of Foods. Rand, McNally, 1917. $1.25.
Bogart, E. L. Economic History of the United States. Longmans, 1913. $1.75.
Callender, G. S. Selections from Economic History of the U. S. 1760-1860. Ginn, 1909. $3.30.

Channing, Edward, and Lansing, M. F. Story of the Great Lakes. Macmillan, 1909. $1.50.

Coman, Katharine. Industrial History of the United States. Macmillan, 1910. $1.60.

Day, Clive. History of Commerce. Longmans, 1907. $2.00.

Moore, J. R. H. Industrial History of the American People. Macmillan, 1913. $1.25.

Oxley, J. M. Romance of Commerce. Crowell, 1907. $.75.

Webster, W. C. General History of Commerce. Ginn, 1903. $1.40.

Wright, C. D. The Industrial Evolution of United States. Scribner, 1900. $1.25.

SUPPLEMENTARY GEOGRAPHICAL MATERIAL FOR USE IN THE GRADES.

By Caroline W. Hotchkiss,
Horace Mann School, N. Y. City.

PUPILS' LIST.

Home and World Geography.

How We Are Fed. Chamberlain, J. F., Macmillan, 1903. $.45.

How We Are Clothed. Chamberlain, J. F., Macmillan, 1904. $.45.

How We Are Sheltered. Chamberlain, J. F., Macmillan, 1906. $.45.

How We Travel. Chamberlain, J. F., Macmillan, 1908. $.45.

Seven Little Sisters. Jane Andrews, Ginn, 1916. $.50.

Child Life in Other Lands. H. A. Perdue, Rand, McNally, 1918. $.50.

Children of the Cold. Fred'k Schwatka, Educational Pub. Co., 1899. $1.25.

Strange Lands Near Home. Youth's Companion Series, Ginn, 1902. [illegible]

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[illegible] H. W. Fairbanks, Ed. Pub. Co., 1908. $.50.

Home Geography [illegible] Fairbanks, Ed. Pub. Co., 1908. $.50.

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U. S. Dept of Agriculture, Washington, D. C.

The Continents and Their People (six books), J. F. and A. H. Chamberlain, Macmillan, 1916. $.55-$.64.

Vikings of the Pacific, A. C. Laut, Macmillan, 1914. $2.00.

Western United States, Harold W. Fairbanks, Heath, 1904. $.60.

Representative Cities of the United States, C. W. Hotchkiss, Houghton, 1913. $.65.

Industrial Cities of the United States, Nellie B. Allen, Ginn, 1910. $.65.

Progress and Development of Our National Parks, Stephen T. Mather, Dept. of Interior, Washington, D. C., 1916.

Story of Chicago, Jennie Hall, Rand, McNally, 1911. $.50.

Type Studies of the Geography of the United States, C. A. McMurry, Macmillan. $.88.

Descriptive Geography from Original Sources, F. D. and A. J. Herbertson, Macmillan. $.75.

Panama and the Canal, Hall and Chester, Newson and Co., N. Y., 1911, $.60.

Barbara's Philippine Journey, F. W. Burks, New World Bk. Co., Yonkers, N. Y., 1914. $.60.

Europe.

Europe—Descriptive Geography from Original Sources, F. D. and A. J. Herbertson, Macmillan. $.90.

Peeps at Many Lands Series—Holland, Russia, Switzerland, Italy, Norway, Macmillan. $.55.

Industrial Studies of Europe, Nellie B. Allen, Ginn, 1913. $.80.

Youth's Companion Series (compiled)—Northern Europe. Under Sunny Skies. Ginn, 1912. $.25 each.

Europe—The Continents and Their People Series, J. F. Chamberlain, Macmillan, 1915. $.64.

South America.

South America, Isaiah Bowman, Rand, McNally, 1915. $.75.

South America, The Continents and Their People Series, J. F. Chamberlain, Macmillan, 1915. $.55.

Central and South America—Descriptive Geography from Original Sources, F. D. and A. J. Herbertson, Macmillan. $.75.

Industrial Studies of South America, Nellie B. Allen, Ginn, 1918. $.80.

Brazil, Peeps at Many Lands Series, Macmillan, 1915. $.55.

Africa and Australia.

In Old Egypt, H. Pereira Mendes, Stokes, 1903. $1.00.

Australian Life in Town and Country, E. C. Buley, Knickerbocker, 1905. $1.20.

Africa. Descriptive Geography from Original Sources. F. D. and A. J. Herbertson. Macmillan. $.70.

Oceania. The Continents and Their Peoples Series. J. F. Chamberlain. Macmillan. 1915. $.55.

Asia

Industrial Studies of Asia. Nellie B. Allen. Ginn. 1916. $.80.

The Changing Chinese. E. A. Ross. Century. 1914. $2.40.

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Toward the Rising Sun. Youth's Companion Series. Ginn. 1912. $.25.

The Continents and Their Peoples—Asia. J. F. Chamberlain. Macmillan. 1915. $.55.

Asia. Descriptive Geography From Original Sources. F. D. and A. J. Herbertson. Macmillan. $.5[illegible]

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Aldrich, Mildred. A study of the results of geography teaching. Journal of Geography, 11:158-165, Jan. 1913. Analysis of examination papers in Geography written by 128 students in the University of Wisconsin and by 238 pupils in the Madison, Wis., high school. A special examination "to ascertain the geographical content of students' minds."

Chamberlain, Jas. F., chairman. Report of the N. E. A. committee on secondary school geography. Proceedings of National Education Association 1909, pp. 820-828. Also in Journal of Geography, 8:1-9, Sept. 1908. One of the most significant reports on the subject in the decade.

Chamberlain, T. C. and others. Report of the geography conference to the Committee of Ten of the N. E. A. 1892. The most epoch-making report in the field of education ever drafted in the United States. U. S. Bureau of Education; part of the Report of the Committee on Secondary School Studies (Bulletin 205) Government Printing Office, Washington, D. C.

Committee of Fifteen, Report on Geography; in Proceedings of the N. E. A. for 1895, pp. 232-237.

Dodge, R. E., editor. Geography for secondary schools. Journal of Geography 6:241-254, 273-285, Mar., Apr. 1908. Summary of replies to a questionnaire sent to more than a score of American geographers. The replies constitute the most valuable collection of opinions on the question of what ought to be the character of secondard school geography that has been published in this country.

——— —, chairman. Report of the committee of the Association of American Geographers on Secondary School Geography. Journal of Geography, 8:159-165, Mar. 1910. The report is in essential agreement with that of the N. E. A. committee (see Chamberlain, Jas. F., above.)

——— —. A study of geography in normal schools. Teachers College Record, XV:1-12, Mar. 1914. Abridged in the Journal of Geography, 18:257-260, Apr. 1915. Very valuable report on the condition of geography in normal schools of the United States.

Dryer, Charles R. Geography in the normal schools of the United States. Journal of Geography, 4:239-243, May-June, 1905. A report based upon a questionnaire and upon printed catalogs.

Gregory, W. M. Symposium upon "What is most needed in the teaching of elementary geography?" Journal of Geography, 10:245-262. Apr. 1912. Statements submitted by twenty representative teachers of geography in schools and colleges.

Keltie, J. Scott. Geographical Education. Report to the council of the Royal Geographical Society. Published in London, 1886. Based upon detailed studies in various European countries; called "A landmark in the history of geographical teaching."

McMillan, Eva M. The present status of geography teaching. Journal of Geography, 10:73-80, Nov. 1911. Replies to a questionnaire on the content of geography and the aims and method of teaching it, received from 45 geographers, authors, and teachers.

Packard, L. O., chairman of investigating committee. Report of Boston's attempt to ascertain results of geography teaching. School document No. 14, 1915, Boston. Abridgment in Journal of Geography, 15:142-149, Jan. 1917.

Peet, Charles E., chairman. The present status of high school physical geography. School Science and Mathematics, 15:322-328, Apr. 1915. Abridged in Journal of Geography, 13:283-286, May, 1915.

Ramsey, E. E. Physical geography in high schools. Reports from 86 schools. School Science and Mathematics, 11:838-848, 12:45-54, 114-125, 1911, 1912.

Whitbeck, R. H., editor. Report of a symposium on the aims in teaching commercial geography. Statements of six authors of text books of commercial geography.

GEOGRAPHICAL READERS IN SERIES

Carpenter, Frank G.: North America, South America, Australia, Europe, Asia, Africa. Europe, 70 cents; others 60 cents.

——— ———How the World is Clothed, How the World is Fed, How the World is Housed. 60 cents each. The American Book Co., New York.

Chamberlain, James F. and Arthur H.: Europe, Asia, North America, South America, Africa and Australia. 55 cents each.

——— ———How We are Fed, How We are Clothed, How We are Sheltered, How We Travel. 45 cents each. The Macmillan Co., New York.

Dalrymple, Julia: Little People Everywhere Series. 45 cents each. Colette in France, Ume San in Japan, Fritz in Germany, Rafael in Italy, Boris in Russia, Hassan in Egypt, Josefa in Spain, Kathleen in Ireland, Betty in Canada, Manuel in Mexico, Gerda in Sweden, Marta in Holland, Donald in Scotland, Chandra in India. Little, Brown and Co., Boston.

Allen, Nellie B.: Industrial Studies. Europe, 80 cents; United States, 65 cents; Asia, 80 cents; South America, 80 cents. Ginn and Co., Boston.

Winslow, I. O.: The Earth and Its People—The United States, Our American Neighbors, Europe, Distant Lands. 50 cents each. D. C. Heath and Co., New York.

Youths Companion Series: Toward the Rising Sun, Strange Lands Near Home, Under Sunny Skies, The Wide World, Northern Europe. 25 to 40 cents each. Ginn and Co., Boston.

Stories Retold from St. Nicholas: Stories of the Great Lakes, Western Frontier Stories, Stories of Strange Sights, Southern Stories, Sea Stories, Island Stories. The Century Company, New York.

Charles McMurry's Books: Larger Types of American Geography, 75c; Type Studies from U. S. Geography, 88c; Excursions and Lessons in Home Geography, 50c. Macmillan Co., N. Y.

Rand-McNally Geographical Readers (Chicago): Asia, Ellsworth Huntington, 75c; South America, Isaiah Bowman, 75c.

Herbertson, A. J.: Descriptive Geography from Original Sources—North America, Central and South America, Australia and Oceania, British Empire, Europe, Asia, Africa, British Isles. 70 to 90 cents each. The Macmillan Co., New York.

Carroll's Around the World Series, 6 Vols., 60 cents each. Silver Burdette and Co., New York.

U. S. GOVERNMENT PUBLICATIONS.

Geography and Explorations. An annotated list of several hundred publications issued by the U. S. Government and sold by the Superintendent of Documents, Washington, D. C. In many cases, schools can secure these publications through their congressman or U. S. Senator. Write Supt. of Documents for "Price list 35, Geography and Explorations." Washington, D. C.

Teaching Material in Government Publications, compiled by Frederick K. Noyes. U. S. Bureau of Education, Bulletin, 1913, No. 47. 10 cents. This bulletin lists not only government publications that are helpful to geography teachers, but also to teachers of agriculture, nature study, economics, etc. The section on geography covers physical geography, commercial geography, miscellaneous papers, and maps.

The Statistical Abstract of the United States is issued annually by the Bureau of Statistics, Washington, D. C. These annual volumes contain an enormous amount of information, well organized and indexed. The principal departments are: (1) Area, Natural Resources, and Population; (2) Agriculture, Forestry, and Fisheries; (3) Manufacturing and Mining Industries; (4) Occupations, Labor, and Wages; (5) Internal Communication and Transportation; (6) Merchant Marine and Shipping; (7) Foreign Commerce; (8) Internal Commerce; (9) Commerce of Noncontiguous Territory; (10) Prices; (11) Consumption Estimates; (12) Record of the

Congress of the U. S. 13, Statistics of the Principal Countries of the World. (Total, 446 pp., $1.50).

Minerals. Most complete reports on the Mineral Resources and Industries are contained in the annual volumes on **Mineral Resources of the U. S.** There are two volumes issued yearly.—I. Metals, and II. Non-metals. While the major part of the report is devoted to the United States, much information is also given regarding foreign countries. These reports are obtained from the Director of the U. S. Geological Survey, Washington, D. C. Can probably be secured for school libraries free.

Agriculture. The Department of Agriculture, Washington, issues an annual called the **Year Book of the Department of Agriculture.** It contains papers on agricultural topics and statistics of farm products, also some information regarding Agriculture in Foreign Lands.

Census. The Bureau of Census has issued a series of very useful bulletins on the different states. Each one contains the 1910 census reports upon Population, Agriculture, Manufactures, and Mining, for the state under consideration. Address Bureau of the Census, Washington, D. C.

Waterways. Volume 15, Senate Documents, 62d Cong., 2d session, is the Final Report of the National Waterways Commission, 579 pages.

Reclamation. Volume 78, House Documents, 61st Congress, 3d session, deals with the Reclamation of Arid Lands. 197 pages.

ANNUALS.

The World Almanac, issued annually by the New York World, contains 800 pages of timely information upon an immense variety of topics. It sells for 35 cents (by mail).

The Tribune Almanac, published by the New York Tribune is similar to the World Almanac, but not quite so large. 25 cents.

The British Almanac, is an annual issued by Cassell and Co., Ltd., London and New York. It contains 400 to 500 pages of facts and figures pertaining especially to the commercial, industrial, political and colonial affairs of the British Empire.

The Britannica Year Book is "A Survey of the World's Progress since the Completion in 1910 of the Encyclopedia Britannica, 11th [illegible] Encyclopedia Britannica Co., New York. Thin paper. [illegible]

The Statesman's Year Book. The most used and most satisfactory of [illegible] Year Books. Over [illegible] pages. The Macmillan Co., N. Y. [illegible]

The American Year Book. A summary of important matters and [illegible] calendar year about 800 pages. D. Appleton & Co., N. Y. [illegible]

CLASSIFIED LISTS OF REFERENCE AND SUPPLEMENTARY MATERIAL

One of the most extensive lists of geographical books and articles for grade teachers is found in the Tarr and McMurry "New Geographies." (Macmillan Co., N. Y. 1910.) In book I see pp. 251-254; in book II, pp. 415-423.

The lists include hundreds of references; in the case of books, the publisher and price are given; in the case of magazine articles, the magazine, volume, page and year are given.

Brigham and McFarlane's Essentials of Geography (Am. Book Co., N. Y., 1916) contains carefully selected lists of references, giving publisher and price. Book I, pp. 257-258; Book II, p. 411. All of the books given in the above mentioned lists are reference works, not supplementary readers or children's books.

Dodge's Geographies contain "Suggestions for collateral reading"; the references are classified to fit specifically the Dodge geographies.

Niver's Gographies (Hinds, N. Y., 1916) include lists of supplementary and reference books, classified by continents and giving publisher and price of book.

King's Advanced Geography (Scribner, N. Y., 1906) pp. 287-288, gives a list of "Collateral Reading" for both pupils and teachers. The books are grouped by continents and give the author's name, but not publisher and price.

LIST OF ARTICLES ON THE TEACHING OF GEOGRAPHY IN EDUCATIONAL MAGAZINES.

By Genivera Loft, University of Wisconsin.

Education, Boston, Mass.

Welles, Mary E. Methods in geography, 7:110-114, 1886.
Daish, Jno. B. The study of geography, 8:315-320, 1888.
Paddock, Miner H. The new geography, 14:482-487, 1894.
Harshberger, J. W. Geographical biology, 14:513-519, 1894.
Ward, Effie M. Geographical interests of children, 18:235-240, 1897.
Gault, F. B. Geographical retrospect, 20:95-99, 1899.
Armstrong, F. B. Geography, Relations to other subjects, 23:331-336. 1903.
Long, Wm. E. Geography teaching with stereographs, 24:526-531, 1904.
Paddock, Miner H. Physiography in public schools, 25:162-171, 1904.
Skinner, A. W. Relations of geography to history, 25:597-601, 1905.
Genthe, Martha K. School geography in the United States, 25:135-141, 1904.

Herrick, C. A. Secondary school commercial geography, 25:129-134, 1904.

Shackford, Martha H. Geography and college English, 26:342-344, 1906.

Redway, J. W. Essentials in geography teaching, 29:65-75, 1908.

Carpenter, Frank O Teaching commercial geography, 29:345-350, 1909.

Whitbeck, R. H. Where to place the emphasis in geography teaching, 31:108-116, 1910.

Brown, R. M. Questioning in geography, 37:167-173, 1916.

Educational Review, New York.

Davis, W. M. The teaching of geography, 3:417-426, 1892. 4:6-15, 1892.

Redway, J. W. Text-books of geography, 5:153-162, 1893.

Mill, Hugh R. Geography in European Universities, 6:417-430, 1893.

Foster, Ida T. Economic geography, 7:286-293, 1894.

Redway, J. W. Status of geography, 7:33-41, 1894.

McMurry, C. A. Geography as a school subject, 9:448-463, 1895.

Dodge, R. E. Railway geography, 19:394-395, 1900.

Dryer, C. R. Organization of geography, 21:26-38, 1901.

Hubbard, Geo. D. College geography, 35:381-400, 1908.

Bishop, A. L. Geography in Universities abroad, 37:477-481, 1909.

Brown, R. M. European war and geography, 49:248-257, 1915.

Brown, R. M. Geography in practice and theory, 55:30-40, 1918.

School Review, Chicago, Ill.

Davis, W. M. Geography in the schools, 1:327-339, 1892.

——————Physical geography in the high school, 8:338-404,449-456, 1900.

——————Physical geography for college entrance, 3:632-640, 1895.

Tarr, R. S. Physiography, the teacher's outfit, 4:161-72, 193-201, 1896.

Russell, J. E. History and geography in higher schools of Germany, 5: 257-268, 539-547, 1897.

Tarr, R. S. Field work in geology and physiography, 5:519-529, 1897.

Brigham, A. P. Physical geography in secondary schools, 5:530-538, 1897.

Goode, J. Paul. The question of map drawing, 12:67-68, 1904.

Anderson, Wm. L. Well balanced course in commerce and industry, 22:455-464, 505-510, 1914.

Walker, C. H. Sketch maps in historical geography, 24:497-514, 1916.

Giles, F. M. Teaching of commercial geography, 24:596-602, 1916.

Whitbeck, R. H. The need of broad gauge courses in geography, 26: 199-204, 1918.

Elementary School Teacher, Chicago.

Betts, G. H. Geography and mental images, 3:506-512, 1903.
Goode, J. Paul. Human response to physical environment, 4:271-282, 1904.
Chisholm, Anna. Graphic representation in geography, 4:297-311, 1904.
Baber, Zonia. Scope of geography, 4:257-270, 1904.
Kenyon, W. J. Consideration of geography texts, 6:97-107, 1905.
Baber, Zonia. A lesson in geography, 7:458-473, 1907.
Gulliver, F. P. Training in geography, 7:84-90, 1906.
Chamberlain, J. F. Geography in the life of the pupil, 8:65-72, 1907.
Bigelow, L. Assignments in geography, 9:250-256, 1909.
Bigelow, L. Social life in geography, 9:113-120, 1908.
Brown, R. M. Outline for the study of Africa, 9:293-308, 1909.
Phillips, C. A. Methods in elementary geography, 10:427-439, 1910.
Stockton, J. L. Revision of the course in geography, 13:219-223, 1913.

Changed to **Elementary School Journal** with Vol. 14.

Brown, R. M. Geography problems: A Continent, 15:520-525, 1915.
Brown, R. M. Geography problems: A Map, 15:355-360, 1915.
Brown, R. M. Geography problems: Africa, 17:276-280, 1916.
Henderson, Bertha, and others. An outline of the course in geography in the University of Chicago Elementary School, 18:11-30, 115-132, 186-205, 268-278, Jan.-Apr. 1917.

School Science and Mathematics.

Snyder, W. H. Teaching of physical geography, 1:20-25, 62-68, 1901.
Goodrich, C. W. Field work in physiography, 1:249-258, 1902.
Holzinger, J. M. Astronomical observations in geography, 1:345-350, 1902.
Howe, E. E. Physiography in the high school, 1:357-359, 1902.
Wood, L. H. Old and new in physiography, 1:421-426, 1902.
Snyder, Wm. H. Geographical experiments, 3:167-171, 1903.
Burchard, E. F. Field work in physiography, 3:341-345, 1904.
Hilands, S. B. Physiography in the laboratory, 3:270-276, 1904.
King, Edw. An aid to geography teaching, 5:365, 1905.
Breeze, F. J. High school geography, 5:516-519, 1905.
Equipment for the physiography laboratory, 5:421-430, 1905.
Wood, H. C. Laboratory work in physiography, 5:253-260, 1905.
Goode, J. Paul. Geography for secondary schools, 6:569-577, 1906.
Darroch, A. The teaching of geography, 7:276-280, 1907.
Martin, Jennie. Field work in physical geography, 7:304-307, 1907.
Wood, H. C. The culture value of physical geography, 7:437-445, 1907.
Platzer, Wm. H. Study of relief forms and maps, 7:446-450, 1907.
Calkins, R. D. Process and feature in physiography teaching, 8:44-48, 1908.

Ramsey, E. E. Physical geography in the high school, 11:838-848, 191; 12:45-54, 114-125, 1912.
Hopkins, T. C. What the college desires of the high school in physiography, 11:623-625, 1911.
Morse, J. F. Physiography as an introduction to science, 11:256-262, 1911.
Haug, B. L. Materials for physiography teaching, 13:427-429, 1913.
Strayer, D. W. Geography for city schools, 14:704-710, 1914.
Whitbeck, R. H. Geography and citizenship, 16:323-327, 1916.
Hubbard, Geo. D. Geography in the high school, 18:291-304, 1918.

Teachers College Record, Columbia, Univ., N. Y. City.

Dodge, R. E., and Kirchwey, C. B. Geography in the Horace Mann School, 2:3-104, 1901.
Marshall, Florence. Fourth grade geography, 8:16-20, 1907.
Peabody, Mary. Fifth grade geography, 8:73-80, 1907.
Kirchwey, Mary. Sixth grade geography, 8:196-205, 1907.
Hotchkiss, Caroline, Seventh grade geography, 8:271-285, 1907.
Geography in Horace Mann elementary school, 14:15-47, 1913.
Dodge & Kirchwey. Geography in normal and secondary schools, 15: 71-137, 1914.
McMurray, F. M. Curricula in geography, 16:317-338, 1915.

THE AMERICAN GEOGRAPHICAL SOCIETY OF NEW YORK.

By W. L. G. Joerg.
Associate Editor, Geographical Review.

The American Geographical Society is the oldest geographical society in the United States. When it was founded, in 1852, there were but twelve similar societies in the world. Among its presidents it has counted George Bancroft, the historian; Henry Grinnell, the staunch supporter of Arctic exploration, after whom Grinnell Land was named; Chief Justice Charles P. Daly, for thirty-five years the vigorous director of the Society's activities; Robert E. Peary; and Archer M. Huntington. Throughout its career the Society has adhered steadfastly to its original objects, which are to collect and disseminate geographical information by discussion, lectures, and publications; to establish in the chief city of the United States a place where may be obtained accurate information on every part of the globe; and to encourage and assist worthy exploring expeditions and research studies.

In pursuance of these objects it has developed a library of 50,000 volumes and a collection of 40,000 maps, both of which are unrivaled

in the western hemisphere; it exchanges publications with more than six hundred kindred associations; and it publishes a monthly magazine, The Geographical Review, containing a wide range of interesting and authoratative articles. Prior to 1916 the magazine of the Society was called "The Bulletin of the American Geographical Society." The complete set of more than fifty volumes contains, it may be said without exaggeration, more geographical material than all other American publications of the time outside of government documents. A general index to this set has recently been issued.

Other special publications are: "Memorial Volume of the Transcontinental Excursion of 1912" (1915), containing numerous papers on the geography of the United States by European geographers; "The Andes of Southern Peru: Geographical Reconnaissance along the Seventy-Third Meridian," by Isaiah Bowman, the present director of the Society (1916); and "The Frontiers of Language and Nationality in Europe," by Leon Dominian (1917). Topics that will be treated in volumes under preparation are the relation of topography to military strategy in the European war and the foreign colonies of Argentine and Brazil.

Two gold medals have been founded by the Society, the Collum Geographical medal and the Charles P. Daly medal. Among those to whom its medals have been awarded are Nansen, Peary, Amundsen, Shackleton, Scott, Sir John Murray, William Morris Davis, Ellen Churchill Semple, Paul Vidal de la Blache.

The Society has a growing membership at present numbering 3,900. The annual dues are ten dollars, which entitles each member to the monthly magazine and the special volume of the current year. Resident members also receive tickets to the bimonthly lectures. The home of the Society is at the corner of Broadway and 156th St., New York City.

THE NATIONAL COUNCIL OF GEOGRAPHY TEACHERS.

By George J. Miller, Secretary.

The movement for the organization of the National Council of Geography Teachers was started in 1914, and the organization was completed during the following year. It has had the hearty support of the Association of American Geographers and of the American Geographical Society. Its purpose is to "increase the effectiveness of geography teaching in America (a) by promotion of national educational movements; (b) by cooperating in the organization and development of state councils; and (c) in such other ways as the officers may from time to time determine." It aims to accomplish its work through the

study of educational problems and contribute their findings to the country as a whole; by giving assistance to school officials, and by providing speakers for meetings. It is probable that the most effective and immediate results will be accomplished by the cooperative efforts of state and local councils.

Although the past few years have been devoted largely to the work of organization, many state councils have been busy on educational problems of vital interest in their respective states. A report on normal school geography by a committee of the National Council is now nearing completion and will be published in the Journal of Geography next fall.

Progressin organization of state councils of geography teachers to June 1918
1. State organization completed.
2. Expect to complete organization in school year of 1918-19.
3. A leader has assumed responsibility for an organization.

Up to 1914 there was no national or state organization in the United States devoted exclusively to the promotion of better geography teaching. There are now active organizations in twenty-five states; five more states will be organized during the coming year, and leaders have assumed responsibility for an organization in nine other states. During the past three years several thousand teachers have attended meetings held under the auspices of the state councils and devoted to the discussion of geography teaching. A meeting place and an annual program are now assured to interested geography teachers in the majority of the states. The National Council consists of approximately 1,000 members.

Never in the history of American education has there been such a demand for geographic knowledge as there is today. Never has there

been such a golden opportunity to demonstrate the value of geographic training. Now is the time to act. Is your state organized? Have you a state council? If not, why not? Will you cooperate at once? Address the secretary for information.

The officers of the National Council for 1918 are as follows:

President, Prof. Albert P. Brigham, Colgate University, Hamilton, N. Y.

Vice President, Dr. Isaiah Bowman, Director American Geographical Society, New York City.

Vice President, Dr. A. E. Parkins, George Peabody College for Teachers, Nashville, Tenn.

Treasurer, Dr. N. A. Bengtson, University of Nebraska, Lincoln.

Secretary, George J. Miller, State Normal School, Mankato, Minn.

THE ASSOCIATION OF AMERICAN GEOGRAPHERS.

By N. M. Fenneman, President in 1918.

The purpose of the Association of American Geographers is to get together the research students of Geography in America. It is said that there is only one other geographical society in the world which limits its membership to productive scholars. In most geographic, as in many other scientific societies, sympathy and interest are the qualifications for membership. Highly useful as is the work done by such societies, the field for them is well occupied in America. Several of these are among the largest and most active geographic societies in the world. To duplicate these would have been unnecessary and perhaps impossible. But the relatively small number of men in this country giving their efforts primarily to geographic research felt that their work needed some form of association; hence the organization of this society in 1902.

As was to be expected, some of the most valuable students of essentially geographic facts and principles were found among the devotees of other sciences, notably Botany, Geology, Geodesy, etc. Where such men have exhibited interest in the distinctly geographic side of their work they have been admitted to membership.

The membership of the association numbers a little more than 100, fairly well distributed over the country in proportion to its population except for a relative preponderence near that great center of science, Washington. The regular meetings are held during the holiday vacation, sometimes in connection with the American Association for the Advancement of Science, or the Geological Society of America; at other times alone. The avowed plan is to distribute these meetings through various parts of the country, but up to the present, much the larger number have been held on or near the Atlantic Coast.

Beginning with 1911 the Association has issued yearly a volume called the "Annals." This book contains papers by members of the association only, and only such papers as promise to have permanent value. It has not, however, been possible to obtain for the Annals all the papers which fulfill these conditions. Many are published elsewhere but so far as possible the annual volume publishes abstracts of all and, when possible, a statement of the place of publication.

Since 1912 the society has had an intimate relation with the American Geographical Society of New York. By the generous terms of this cooperative agreement and the interest shown by the American Geographical Society, the work of the Association has been greatly favored. In return the A. A. G. holds a spring meeting each year in New York in conjunction with the American Geographical Society.

THE NATIONAL GEOGRAPHIC SOCIETY.

By Gilbert H. Grosvenor, Director.

The National Geographic Society was incorporated in 1888 "for the increase and diffusion of geographic knowledge." The first part of its corporate mission is carried out by sending into the field exploring expeditions of its own, and by support given in conjunction with other institutions to other expeditions which could not carry out their work but for such aid.

The work of its expeditions to Alaska for the study of vulcanism in the Katmai region, under the leadership of Dr. Robert F. Griggs, has resulted in many striking discoveries. One of these, the Valley of Ten Thousand Smokes, is regarded by scientists as the eighth wonder of the world. There are millions of vents and fumeroles in the region, giving off steam enough to turn the wheels of civilization could it be harnessed. The Society sent an expedition to Mt. Pelee to investigate vulcanism problems there, and to Sicily to study the Messina Earthquake.

Another line of investigation it has pursued is the process of glaciation as revealed in the glacier region of Alaska.

Its researches in the high Andes of Peru, through expeditions placed in the field under its patronage in conjunction with Yale University, and under the leadership of Prof. Hiram Bingham, formed a notable contribution to the story of pre-Columbian civilization. Professor Bingham's studies resulted in the excavation of the ancient capital of the Incas, Machu Picchu. The region is believed to have been the most densely populated section of America before its discovery by Columbus. The Incas are found to have had pottery strikingly like that of Greece, to have been such a peace-loving people that they had only one word for soldier and enemy, and to have practiced the art of

skull trepanning. O. F. Cook, the botanist with the expeditions, shows that when the people of Europe were dressed in skins and living the life of the chase, settled agricultural conditions prevailed in Inca land. Reclamation projects surpassing anything we know were carried out, even the very soil itself being transported long distances. He also shows that the Incas were the world's greatest domesticators of plants, the potato, the most extensively grown crop in the world, being a product of their culture.

The Society has made a biological survey of the region east of Hudson Bay, and has supported much Arctic and Antarctic exploration work—notably that of Admiral Robert E. Peary, which resulted in the discovery of the North Pole. It also has cooperated with the National Government in the saving of some of the finest of the "big trees" in California by the appropriation of $20,000 from its treasury for their acquisition for the Nation.

In the furtherance of the second part of its chartered object, "the diffusion of geographic knowledge," it has a number of activities, the most important, of course, being the publication of the National Geographic Magazine. This magazine goes to every member of the Society and not only carries accounts of all the research activiteis of the Society itself, but brings to the membership pen and camera pictures of all races, all peoples, all places and all activities upon which the world's attention is focused. The whole world is searched over for pictures that tell the month to month stories of men, places and events. The 1,400 or more of such pictures published annually represent the cream of the world's photographic records. The same is true of the articles which the pictures illustrate. No other magazine in existence devotes as much space to color work. Its "Flag Number" is conceded by Army and Navy authorities to be the best compilation of the world's flags and their history extant; its wild animal, bird, and flower color sections have awakened the enthusiasm of layman, zoologist, ornithologist and botanist alike.

The Society also maintains a lecture course in Washington each season in which the nation's notables participate. Ex-Presidents, Roosevelt and Taft, Former Ambassador Bryce, Ambassador Jusserand, Sir Ernest Shackleton and General George W. Goethals are among those who have occupied its platform.

The latest work the Society has undertaken is to bring the treasures of its picture files down to the school children. Not content with making the magazine available for school use, it now has under development a plan which will make thousands of pictures available for teaching geography to children in the unforgettable language of the eye.

The offices of the National Geographic Society are in Washington, D. C. The Society now has 650,000 members.

THE GEOGRAPHICAL SOCIETY OF PHILADELPHIA*

The Geographical Society of Philadelphia was organized on April 20, 1891, under the title of the Geographical Club of Philadelphia, with Prof. Angelo Heilprin as president.

The aims of the club, according to its charter are "the advancement of the science of geography, and of geographical studies and exploration, the recording of discoveries, and the presentation of researches, and the accumulation of works on geography."

The society publishes a magazine, entitled "The Bulletin of the Geographical Society of Philadelphia," its name having been changed to this form in 1896.

The membership is of four classes: (1) the active or resident members, living in or near Philadelphia; (2) the non-resident members, who pay one-half the fee of the active members, and who live seventy-five miles or more from Philadelphia; (3) corresponding members chosen from prominent workers in geographical lines; (4) honorary members, consisting of those who have especially distinguished themselves in the field of geographical knowledge or exploration. The maximum limit to the number of this last class is twenty-five.

The society awards annually the Elisha Kent Kane Medal of the Geographical Society of Philadelphia for important geographical exploration or research made within the preceding two years.

Among its special activities has been its association with others in furnishing financial support to the Peary Arctic Expedition of 1893, and the Peary Auxiliary Expedition of 1894. It also conducted the experiment called the Melville-Bryant Drift Cask Project, designed to determine the speed and direction of Arctic currents. It has offered special prizes to stimulate interest in geography, as, for example, in 1912 a prize of twenty-five dollars for an essay on "The Prosperity of Pennsylvania as Determined by Geographical Factors," to be written by a man in the geography classes of the University of Pennsylvania.

THE GEOGRAPHICAL SOCIETY OF CHICAGO

By Rollin D. Salisbury,
University of Chicago.

The Geographical Society of Chicago celebrated recently its twen[illegible] anniversary. For a number of years after its founding in 1898, the Society remained small, but later its number increased to such an extent that it became necessary to put limits upon the membership, because of the limited capacity of rooms available for lectures. This lim-

* Compiled by W. O. Blanchard.

it has been raised from time to time, and is now 700. For a number of years the Society has had its regular meetings in Fullerton Hall, in the Art Institute. When the new Field Museum is completed, it is hoped that a larger auditorium will be available, and that the membership limit may then be set at a higher figure.

In the first years of its history, the Society had occasional lectures only, and these as lecturers were available, rather than at fixed periods. A little later the lectures were held at regular intervals of a month, from October to May. During recent years, there have been two lectures a month, as a rule, and in many cases the same lecture is given both afternoon and evening. In most cases, the seating capacity of the hall is taxed. The Society conducts several field excursions yearly.

The Socity has published five bulletins, and another is now going through the press. Their subjects are, The Geography of Chicago and Its Environs, by Professor Rollin D. Salisbury and Dr. William C. Alden; The Plant Societies of Chicago and Vicinity, by Professor Henry C. Cowles; Lantern Illustrations for the Teaching of Meteorology, by Professor Henry J. Cox, Professor J. Paul Goode, and others; The Weather of Chicago, by Professor Henry J. Cox and John H. Armington; and Animal Communities in Temperate America, as Illustrated in the Chicago Region; A Study in Animal Ecology, by Dr. Victor E. Shelford. The one now in press is on The Starved Rock State Park, by Dr. Carl O. Sauer (Geography), Dr. Gilbert H. Cady (Geology), and Professor Henry C. Cowles (Botany).

Besides these larger bulletins, three smaller Excursion Bulletins have been issued.

The Society has awarded 12 gold medals since 1907.

GEOGRAPHICAL MAGAZINES PUBLISHED IN THE UNITED STATES AND GREAT BRITAIN.

Annals of the Association of American Geographers. Official organ of the association. Vol. I issued in 1911. One issue per annum. Bound in paper, \$3.00; cloth, \$3.50. Broadway at 156 St., N. Y. City.

Bulletin of the American Geographical Society; followed Vol. XXII of the Journal of the American Geographical Society, Vol. XXIII (1901) to Vol. XLVII (1915), then changed to the Geographical Review.

Bulletin of the American Bureau of Geography. Vol. I, 1900, Vol. II, 1901. Merged with the Journal of School Geography in 1901.

Bulletin of the Geographical Society of Philadelphia. Quarterly. Vol. XVI current in 1918. \$2.00 a year. 400 Witherspoon Building, Philadelphia, Pa.

Geographical Review. Successor to the Bulletin of the American Geographical Society, Vol. XLVII (1915). Vol. I, Jan.-June 1916. 2 Vols. a year. Organ of the American Geographical Society, New York. $5.00 a year, monthly. Broadway at 156 St., N. Y. City.

National Geographic Magazine. Vol I, 1889. Vol. XXXIII current in 1918. Organ of the National Geographic Society, monthly, $2.50 per annum. $2.00 to members. Washington, D. C.

Journal of Geography. Vol. I, 1902. Vol. XVI current in 1917-18. Organ of the National Council of Geography Teachers. 10 months. $1.00 a year including membership in National Council if requested at time of subscribing. Editorial office, University of Wisconsin, Madison. Publication office, Appleton, Wis.

Journal of School Geography. Vol I, 1897 to Vol. V, 1901. In 1901 united with the Bulletin of the American Bureau of Geography and became Vol. I of the Journal of Geography.

BRITISH GEOGRAPHICAL MAGAZINES.

Geographical Journal. Official organ of the Royal Geographical Sociey. 2 volumes a year. $6.00 per annum. Vol. 51 current Jan.-June, 1918. Kensington Gore S. W. 7, London, Eng.

Geographical Teacher. Official organ of the Geographical Association (teachers) of Great Britain. Quarterly. $1.50 per annum. 32 Fleet St. E. C. London, Eng.

Journal of the Manchester Geographical Society. Published in four parts annually. One volume a year. Vol. 34 current in 1918 (if issued). 16 St. Mary's Parsonage, Manchester, England.

Scottish Geographic Magazine. Organ of the Royal Scottish Geographical Society. Monthly. Vol. 34 current in 1918. $4.50 per annum. Synod Hall, Castle Terrace, Edinburgh, Scotland.

OTHER MAGAZINES PUBLISHING GEOGRAPHICAL ARTICLES.

The Americas. A monthly publication issued by the National City Bank of New York. Contains authoritative articles on both Latin-American subjects and on commercial subjects of a world-wide character. No price given; write for terms.

Asia. Journal of the American Asiatic Association, 28 Madison Ave., N. Y. City. A beautifully illustrated monthly with many good articles on Asiatic topics. $3.00 a year to non-members of the Association.

Bulletin of the Pan-American Union. Devoted to articles, items, and news dealing with Latin-America; monthly, illustrated. Pan-American Building, Washington, D. C. $2.00 a year.

Commercial America. Issued monthly by the Philadelphia Commercial Museum. Regularly contains two or more articles dealing with important American industries. Articles are usually statistical and informing. $2.00 a year.

Inter-America. A recently instituted monthly; alternate months in Spanish and English. Not illustrated, and only partially geographical, but helpful to teachers. 6 English issues a year, 80 cents. Doubleday, Page and Co., 407 W. 117th St., N. Y. City.

The Nations Business. Published monthly by the Chamber of Commerce of the United States. Well illustrated; many articles of timely value to classes in Economic Geography. Washington, D. C. $2.00 a year.

School Science and Mathematics. A monthly journal for secondary school teachers. Frequent articles on the teaching of high school geography. 2059 E. 72nd Place, Chicago, Ill. $2.50 a year.

See America First. An illustrated bi-monthly magazine especially devoted to western scenes and articles. National Realty Building, Tacoma, Wash. $1.00 a year.

The South American. One of the newer monthly magazines devoted to South America. Well illustrated; all of the articles have a geographic bearing. South America Pub. Co., 165 Broadway, N. Y. City. $2.50 a year.

Travel. A beautifully illustrated monthly devoted to travel articles, American and foreign. Published by McBride, Nast and Co., 31 E. 17th St., N. Y. City. $3.00 a year.

American Forestry. Illustrated monthly. $3.00 a year. Washington, D. C.

American Industries. "The Manufacturer's Magazine." Monthly. 30 Church St., N. Y. City. $1.00 a year.

Irrigation Age. Illustrated monthly. 213 Templeton Building, Salt Lake City, Utah. $1.00 a year.

The Review of Reviews. 30 Irving Place, New York City. $3.00 a year.

The World's Work. Garden City, Long Island. $3.00 a year.

MAPS AND GLOBES: PUBLISHERS, IMPORTERS AND DEALERS.

Rand, McNally and Co., Chicago, Ill.
A. J. Nystrom and Company, 2249-2253 Calumet Ave., Chicago.
C. S. Hammond & Co., 34 Church St., New York.
Denoyer-Geppert Co., 460 E. Ohio St., Chicago, Ill.
Geography Supply Bureau, 115 Kelvin Place, Ithaca, N. Y.

A. Flanagan Co., 521 So. Wabash Ave., Chicago, Ill.
Ohman Map Co., 258 Broadway, New York.
Peckham, Little & Co., 57 E. 11th St., New York.
Central Scientific Co., 460 E. Ohio St., Chicago, Ill.
Educational Exhibition Co., 26 Custom House St., Providence, R. I.
W. M. Welch Mfg. Co., 1516 Orleans St., Chicago, Ill.

MINERALS.

Geography Supply Bureau, 115 Kelvin Place, Ithaca, New York.
Ward's Natural Science Establishment, Rochester, New York. (Extensive.)
Howell's Microcosm, 612 Seventeenth St., N. W., Washington, D. C. (School cabinet of 40 rocks and minerals for $3.00.)

MAKERS OF LANTERN SLIDES.

Keystone View Company, Meadville, Pa.
Geographical Supply Bureau, 115 Kelvin Place, Ithaca, N. Y.
McIntosh Stereopticon Co., 30 E. Randolph St., Chicago, Ill.
Underwood and Underwood, 417 Fifth Ave., New York.
Haynes Studios, Selby St. at Virginia, St. Paul, Minn.
Detroit Photographic Co., Detroit, Mich.
Williams, Brown and Earl, 918 Chestnut St., Phila., Pa.
Victor Animatograph Co., 148 Victor Bldg., Davenport, Iowa.
George W. Bond Slide Co., 14 W. Washington St., Chicago, Ill.
Chas. Beseler Co., 131-133 E. 23rd St., New York.
T. H. McAllister and Co., 49 Nassau St., New York.
School and Community Slide and Film Service, 17 N. La Salle St., Chicago, Ill.
Central Scientific Co., 460 E. Ohio St., Chicago.
Briggs, C. W., 628 Callowhill St., Philadelphia.
Excelsior Illustrating Co., 219 Sixth Ave., New York.
Moore Hubbell and Co., 713 Masonic Temple, Chicago.
H. C. White Co., N. Bennington, Vt.
Wm. H. Rau, 238 S. Camac St., Philadelphia, Pa.
Swain, C. R., Ann Arbor, Mich.
Cheyney, Alvin E., Granville, Ohio.

OUTLINE MAP PUBLISHERS.

(Send for catalogs and prices.)

A. J. Nystrom and Co., 2249-2253 Calumet Ave., Chicago. Also publish large wall outline maps printed on heavy manila paper; also blackboard outline maps.
Rand, McNally and Co., Chicago, Ill. Also publish blackboard outline maps.
University of Chicago Press, Chicago. (Goode Base Maps.)

The McKinley Pub. Co., Philadelphia, Pa. Also publish large wall outline maps, printed on heavy manila paper.

Wm. Beverley Harison, 11 Broadway, New York. Maps printed in blue.

A. J. Nystrom and Co., 2249-2253 Calumet Ave., Chicago. Also publish

McKnight and McKnight, Normal, Ill. Also publish specially designed maps for work in locational geography.

D. C. Heath & Co., Boston.

Jennings Publishing Co., Box 17, P. O., Brooklyn, N. Y. Maps printed in brown.

Hinds, Hayden & Eldredge, New York.

STEREOPTICON MAKERS AND DEALERS.

Bausch & Lomb Optical Co., 412 St. Paul St., Rochester, N. Y.
Keystone View Co., Meadville, Pa.
McIntosh Stereopticon Co., 30 E. Randolph St., Chicago, Ill.
Badger Stereopticon & Picture Machine Company, La Crosse, Wis.
Colwell & Company, F. E., 459 Broadway, Albany, N. Y.
Spencer Lens Company, Buffalo, N. Y.
Victor Animatograph Co., 148 Victor Bldg., Davenport, Ia.
T. H. McAllister Co., 49 Nassau St., N. Y. City.

A LIST OF ATLASES.

By J. Paul Goode,*
University of Chicago.

The following list of Atlases is only a beginning. It has been compiled hastily, and may serve as a first aid in the choice of a library. A much more complete list will be issued later.

In the following list the prices given are only approximate. Publisht prices can not now be depended on. In some cases the current prices are nearly twice the publisht price, and in many cases the books can not be obtained at all. One should inquire the price before ordering.

ATLASES FOR GENERAL REFERENCE

1. **Smith, B. E. The Century Atlas of the World.** N. Y., The Century Co. 1899 or later. 9¼x12½ inches. Price about $12.00. 118 plates in color. Index of 402 pp.

   Wax engraving. Very full information on U. S. A. Separate state maps, with counties, and in the western states, townships shown.

*The writer's system of modified spelling is retained in this article contrary to the usual practice of the Journal of Geography.

A library reference atlas of convenient size. Very full of place names. Railways and steamship routes shown. Best type of American atlas. Inferior in workmanship to the larger European atlases, which are engraved on copper.

2. **The M. P. Atlas.** A collection of maps showing the commercial and political interests of the British Isles and Empire, throughout the world. Edinburgh and London. W. and A. K. Johnston. 1907. 12¼x19½ inches. 40 two-page plates in color. A slender index of 9 pp. but which gives latitude and longitude of places. Price about $10.00.

   Good reference for British Empire, tho the index is inadequate. Not to be compared in quality of work, with the larger atlases of Bartholomew.

3. **Stanford's London Atlas of Universal Geography.** Folio Edition. 100 maps, with a list of latitudes and longitudes. Size 15¾x22 inches. London. Edward Stanford. 1896. Price about $20. List of names, 29 pp. with latitude and longitude.

   The largest of the reference atlases. Engraved on copper. A high quality of work, but not equal to the best work of Bartholomew. Especially valuable for large scale, detailed maps of small important areas.

4. **The Library Atlas of the World.** 15¼x20½ inches. Two Volumes. Price about $15. Chicago: Rand McNally & Co.

   Volume I. The United States of America. 331 pp. maps in color, the reverse of each sheet used for index. Many maps added, showing relief by shading, as tho photograft from a model. Marginal division for location.

   Volume II. Foreign Countries. 109 pp. Maps in color on one side only of the paper. 167 pp. index, giving city populations.

   This is the largest and best reference atlas made in America. It is a political atlas tinted to show countries and other governmental subdivisions. It is exceedingly well filled with place names, and very ample indexes make it possible to locate any place easily. New editions of this atlas are printed each year, and it is continually under revision. For business and library reference it hardly has an equal.

5. **Bartholomew, J. G.. The Twentieth Century Citizen's Atlas of the World.** Containing 160 pp. of maps and plans in color, with an index, a gazetteer, and geographical statistics. London: George Newnes, ltd. 1903 (?). Size 8½x11 inches. Price about $5.00.

   A very valuable series of maps, physical and political in the careful manner of J. G. Bartholomew. Plates are two page mounted on stub, one side only printed. Generous in insets of

city plans. Especially complete for British lands. Index of 70 pp., with latitude and longitude, and gazetteer of 134 pp. One line to a name.

6. **White, J. Atlas of Canada.** Ottawa. Department of Interior. 1906. Size, 12½x17¼ inches. Price $3.50. Pl. 81 in color, of maps, city plans, and grafic statistics.

   Maps mostly two page: physical, political, industrial, and commercial, climate, population, ethnic, historic, and city plans. Printed one side, mounted on stub. Excellent work, very complete.

7. **Reclus, O. Atlas de la plus Grande France.** 9¾x13¼ inches. 160 cartes en couleurs, 160 pp. text. Price about $6.00. Paris: Attinger Freres. Not dated. About 1916.

   A magnificent piece of work. Detailed physical and economic maps of every department of France and the colonies. For each double page map two pp. text or black and white maps and diagrams. A model of the maximum of information, presented in the most pleasing manner. There is no atlas in English to compare with it in value, in the nature of the service rendered, and the quality of workmanship in book making.

8. **Rand, McNally & Co. International Atlas of the World.** 11x14 inches cloth. pp. 329. 1915. Chicago: Rand, McNally & Co. Price about $4.00.

   Maps and text. Very ample index. Statistics very full on United States of America. The best example of the wax process as used in American atlas making. The best reference atlas for the American home and desk, considering point of view, and price.

9. **Schrader, F. Atlas de Geographie Moderne.** 64 cartes en couleurs, texte geographique, statistiques, etc. Paris: Hachette et Cie. 1904. 9¾x15 inches. Price about $3.00.

   A most excellent work. In the typical French style every page is used. The colored maps are double page, mounted on stub; and the reverse side is occupied with text, and many fine maps and grafs in black and white. Especially full on France and her colonies. The French conception, more than that of any other nation, coincides with the best American vision of the point of view and scope of geography.

10. **Hammond: Comprehensive Atlas of the World.** 6½x9¼ inches. 256 pp. maps. 255 pp. text. Price about $2.50. Text includes a good brief gazetteer of principal cities of the world, and index.

    This is a good example of the cheapest possible workmanship in the making of an atlas. Somewhat careless drawing, and still

more careless printing, cheap color, and cheap paper. But it can be defended because of its cheapness, putting a very large mass of information within reach of a very large public.

11. **Vidal-Lablache. Atlas General; Histoire et Geographie.** 10½x 14 inches. 420 cartes et cartons. Index de 46,000 noms. Paris: Librairie Armand Colin. 1909. Price about $3.00.

    Physical maps as basis of history and geography. Excellent work, in the usual generous French fashion. Both sides of the paper used, and a marvelous quantity of information given.

12. **Bartholomew, J. G. Handy Reference Atlas of the World.** 4¾x 7 inches. Price about $2.50. London: John Walker. Frequent revisions. 76 plates+76 ½ plates. Index 56 pp., very ample.

    Mostly political maps, with a wealth of large scale detailed maps of cities and restricted areas of large interest. A very good example of high class work, sold at a low price, to serve a large public.

13. **Philip: Handy Volume Atlas of the World.** 3¾x5⅝ inches. 72 pages of plates in color. Reverse side of sheet with text, of gazetteer material. Index of 114 pp. Highest quality of paper. Drawing, printing and color well done. The best of the pocket atlases. London: George Philip & Son. 1914. Price about $1.00.

14. **Bartholomew, J. G. Handy Shilling Atlas of the World.** 3½x 5⅞ inches. London: George Newnes. 120 pp. maps in color, 160 pp. gazetteer. Excellent quality. The maximum of quality and quantity in so small a size.

15. **Schrader, F. Atlas de Poche.** (Pocket Atlas). 68 pp. maps in color, with text of geographic statistical information, and index. 4¾x7½ inches. pp. 131. Price about 75c. Paris: Hachette et Cie. No date. But new editions up to date.

    A reference pocket atlas, surprizingly complete and well done, in so small a work.

16. **Stanford's Atlas of the Chinese Empire.** (For the China Inland Mission). London: Stanford. 9¼x13¼ inches. 22 plates. No date, recent. Price about $3.00.

    Separate maps of the 18 provinces of China proper, and of the four great dependencies. A good piece of work. Best source on China.

17. **Bartholomew, J. G. Constable's Hand Atlas of India.** London: A. Constable & Co. 1893. Size 5x7¼ inches. Price $2.00.

    A series of 60 maps and plans in color, mostly two pages, all on stub, all in the fine, high quality of Bartholomew.

PHYSICAL AND COMMERCIAL ATLASES

18. **Bartholomew, J. G. and Herbertson, A. J. Atlas of Meteorology,** Volume III of Bartholomew's Physical Atlas. Prepared at Edinburgh Geographical Institute, and publisht by A. Constable, Westminster. 1899. 11½x18 inches. 34 plates, containing over 400 maps. 40 pp. text. Price about $18.00.

This is volume III, and the first part issued, of a great Physical Atlas, which in the announcement of 1899, was planned to consist of seven volumes. It is done in the highest quality of the atlas making art. There is nothing else in the world in the way of a physical atlas to compare with it. It is indispensable to the working meteorologist, and climatologist, and should be in every well equipt library.

19. **Bartholomew, J. G. Atlas of the World's Commerce.** Maps with text and diagrams, showing products, imports, exports. 10x13 inches. 176+54+42 pp. London: George Newnes. 1907. Price about $6.00.

The most ambitious commercial atlas. Unfortunately such an atlas is soon out of date.

20. **Philip: Mercantile Marine Atlas of the World.** A series of 30 plates containing over 100 charts and plans, with tables of 8600 distances between ports, etc., and a complete index of 20,000 ports with latitude and longitude. London: George Philip & Son. 1904. Size 15x19½. Price about $5.00. Maps mostly on Mercator's projection. A generous number of small insets of city plans. The best marine atlas; kept up to date.

21. **Finch, V. C., and Baker, O. E. Geography of the World's Agriculture.** 13¼x19¼ inches. pp. 150. Washington, D. C. U. S. Department of Agriculture; Office of Farm Management. 1917. Price not stated.

Mercator's World (1) showing land relief, and (2) showing Mean Annual Precipitation. Both in color. Excellently done. 140 pp. Black and white dot maps and text. An invaluable contribution, showing by means of dot maps of the world, and of the various countries, the density of production of the various farm crops of the world, both plant and animal. Statistical comparisons also given, by well made graphs. Nothing like it has been done hitherto.

22. **Statistical Atlas of the United States.** Washington, D. C., Department of Commerce, Bureau of the Census, 1914. Size 9x11½ inches. No price given. Can be obtained by libraries, thru Congressmen and Senators. Text pp. 100. Plates 503, a dozen of them in color, the others in black and white maps and graphs.

Data on population density and distribution; agriculture, manufacturing, mines, and quarries, financial and social relations. Printed on the best of paper, distinctly superior in workmanship. The wealth of information here given, and the quality of work done, give the student a mine of information about our own country.

23. **Shepherd, William R. Historical Atlas.** N. Y. Henry Holt Co. 1911. Size 6¾x10 inches. Price $2.50. Pages of Maps in color 216. Two page maps, on stubs, with reverse sides printed as one page maps. An index of 94 pp. not giving latitude or longitude.

An excellent series of maps, general and special. These maps were made and printed in Germany. As a matter of self-respect and patriotism the publishers should see to it that a new edition is made in America.

24. **Smith, George Adam, and Bartholomew, J. G. Atlas of the Historical Geography of the Holy Land.** London: Hodder and Stoughton. 1915. Size 9½x13½ inches. Plates 60 in color, 2 pp., on stub. 36 pp. text, descriptive. Price about $2.00.

A superlative dissected physical map of Palestine, and adjacent regions. The highest Bartholomew quality in drawing, color and press-work.

25. **Bartholomew, J. G. Atlas of Ancient and Classical Geography.** In "Everyman's Library." London: J. M. Dent. 4¼x6¾ inches. Price about 50c.

26. **Bartholomew, J. G. A Literary and Historical Atlas of Europe.** In "Everyman's Library." London: J. M. Dent. 1912. 4¼x 6¾ inches. Price about 50c. 96 pp. maps. 253 pp. text, including index, gazetteer, and a historical survey of English coinage. 34 pp. maps of battle grounds and cities.

27. **Bartholomew, J. G. A Literary and Historical Atlas of Asia.** London: J. M. Dent. 4¼x6¾ inches. Price about 50c. 96 maps in color. 30 pp. coinage in Asia. 16 pages maps of battle grounds and cities. 80 pp. text, gazetteer and index.

28. **Bartholomew, J. G. A Literary and Historical Atlas of Africa and Australia.** In "Everyman's Library." London: J. M. Dent. Price about 50c. 64 pp. maps in color; 21 pp. on coinage; 36 pp. city plans, battle grounds, etc., in black and white. 81 pp. gazetteer and index.

29. **Bartholomew, J. G. A Literary and Historical Atlas of America.** In "Everyman's Library." London: J. M. Dent. 4¼x6¾ inches. Price about 50c. 96 pp. maps in color; 18 pp. coinage; 22 pp. plans of battle fields, etc; 92 pp. gazetteer and index.

This series in Everyman's Library, brings a very well made general historical atlas within the reach of every student. There are no better values.

30. **Robertson, C. Grant, and Bartholomew, J. G. An historical atlas of Modern Europe from 1789 to 1914.** Oxford: University Press. 11x14 inches. 36 pp. maps in color; 24 pp. text. Price 3 s. 6 d.

A recent addition to the long list of well made, and inexpensive students atlases, for which the world is indebted to Mr. Bartholomew. The maps in this volume bring modern Europe up to the year 1914.

STUDENTS' ATLASES; GENERAL, PHYSICAL, COMMERCIAL.

31. **Schrader, F., et Gallouedec, L. Atlas Classique, de Geographie Ancienne et Moderne.** Paris: Hachette et Cie. 1914. 8¾x12½ inches. Price 8 fr. about $1.60. 96 pp. of maps, 8 pp. grafic statistics, very good index.

This is the best type of student's atlas extant. Every inch of space is used, often with many small detached maps on a page, and very helpful text at bottom. The maps are excellently drawn and printed. The best collection in existence of educational material, in atlas form for school use. A generous collection of ancient, medieval and modern historical maps; and for general geography, maps, physical political, commercial. Especially full and valuable on France. A very instructive variety of grafic statistics appended.

This atlas is also issued in small divisions, bound in boards, for various classes in schools, from 6th down to first, running from 2 f. 50 to 3 f. 50.

32. **Bartholomew, J. G. Comparative Atlas, physical and political.** 8¼x11 inches. 64 pp. of maps and index. Price about $1.00.

Well drawn and printed. Quite full on British Isles. The best physical maps in any of the small students' atlases; the best general atlas in cheap form for students use. London: Meiklejohn and Holden. No date, but kept up to date by annual editions.

For each unit area shown there is a physical and also a political map.

33. **Longman: New School Atlas.** 6¾x19¾ inches. 38 pp. maps on stub. Printed one side only. Good index with latitude and longitude of places. New York: Longman Green & Co. Price about $1.75.

Best quality drawing, ink, printing. All maps physical with one contour 1000 feet on land, and 100 fathoms in sea. Political

boundaries in red on the map. A very excellent atlas, deservedly popular. Very good—as far as it goes. Only about one tenth the information presented, as in the French atlas, of same grade and equivalent price.

34. **Atlas fur Schweizerische Mittelschulen.** Von der Konferenz der Kantonalen Erziehungsdirectoren. Zurich: Winterthur, A. G. 1910. pp. 136. Maps only. Price about $1.75.

Best quality map work, lithografic. Maps on the physical basis, but political maps also. A wealth of small maps of large scale and ample detail, of cities and local regions of large interest. The best example of students' atlas produced in Europe, outside of France.

35. **Bartholomew, J. G. The International Students' Atlas of Modern Geography.** 105 maps, physical, political, statistical. Price about $2.50. London: George Newnes. No date, but reissued with revisions and recent maps. Size 9¾x13 inches. 90 pp. maps. Very full index of 70 pp. Excellent work.

36. **Bartholomew, J. G. A School Economic Atlas.** Oxford: Clarendon Press. 1911. 64 pp. maps. Price about $1.00.

Very valuable feature of 2 pp. of comparative maps of each continent with January and July temperature and precipitation; orography; vegetation; population density; and political divisions. Distribution maps of chief commercial commodities. Best available school atlas for commercial geography.

37. **Stanford, William. The Map and Its Story.** A physical atlas. 9¾x12 inches. Paper covers. 44 pp. Price about one shilling. 1917 (?). London: G. W. Bacon & Co.

Maps and text. Maps of Continents, physical, with contours and tints. Climatic maps, vegetation, trade routes, a variety of maps for British Isles. A good idea, maps somewhat crudely drawn and printed, but a wonderful bargain at 25c.

38. **Bartholomew, J. G. An Atlas of Economic Geography.** 8¾x11 inches. About 50 pp. of maps. London: Oxford University Press. 1914. Price about $1.50. About the same material as No. 36.

39. **Philip, G. Modern School Atlas of Comparative Geography.** 80 plates in color. 142 maps and diagrams, and an index. 8¾x11 inches. London: George Philip & Son. 1913. Price about $1.00.

Maps cut in two at hinge, not on stubs. Presswork and ink not of the best. Comparative. Physical and political maps of continents and some countries. Summer and winter climate, vegetation and population. Black plate somewhat muddy. In qual-

ity of work distinctly inferior to the equivalent publications of Bartholomew, Longman, and Stanford.

40. **Allen, F. An Atlas of Commercial Geography.** 8¾x11 inches. 48 pp. of maps, and index. Cambridge: University Press. 1913. Price about 75c. World maps are very small. Maps physical, political, and commercial. Comparative feature of relief climate, vegetation, population, crops and industries. Quality of ink and press work somewhat inferior.

LIST OF MATERIALS AND INDUSTRIAL EXHIBITS OBTAINABLE FREE OR AT SMALL COST

The most complete and most carefully prepared list of this kind is Bulletin 54 of the Charleston, Ill., Normal School, Oct. 1916., compiled by Mary Josephine Booth. Free while they last. An abridged list from the above bulletin, printed in the Journal of Geography, Vol. 15, pp. 285-318, May 1917, is out of print but will be found in the bound volumes in public libraries.

SUMMER COURSES IN GEOGRAPHY.

Compiled by F. E. Williams,
University of Wisconsin.

The following list is incomplete. An effort was made to secure information from all the larger universities and many of the smaller ones. Some did not respond to our inquiries and others did not send details regarding courses.

UNIVERSITY OF ALABAMA, UNIVERSITY.

General Geography, Miss Luther.

UNIVERSITY OF CHICAGO.

The Elements of Geography, Dr. Colby.
Economic and Commercial Geography, Professor Goode.
Geography of North America, Dr. Colby.
The Geography of the Great War, Professor Goode.
Influence of Geography on American History, Professor Barrows.
Conservation of Natural Resources, Professor Barrows.
Physiography, Professor Salisbury and Professor Trowbridge.
Field Geography, Southwestern Wisconsin, Assistant Professor Jones.

The School of Education of Chicago University offers courses in:

Geography in the Primary Grades, Associate Professor Baber.
Geography in the Elementary School: Eurasia, Associate Professor Baber.
The Supervision of Geography in the Elementary School, Associate Professor Baber.

Methods in Geography. Professor Thompson.
Physical Geography. Briefer Course. Professor Thompson.

UNIVERSITY OF OKLAHOMA, NORMAN.

Physiography. Assistant Professor Williams.
Economic Geography of North America. Mr. [illegible].
Teacher's Course in Physiography. Assistant Professor Williams.

PENNSYLVANIA STATE COLLEGE, STATE COLLEGE.

Physical Geography. Mr. Nutting.
Teachers' Geography. Mr. Nutting.

UNIVERSITY OF SOUTH DAKOTA, UNIVERSITY.

Geography and the Teaching of Geography. Miss [illegible].

SUMMER SCHOOL OF THE SOUTH, UNIVERSITY OF TENNESSEE, KNOXVILLE.

Home and World Geography. Miss Bertha Henderson.
North America. Miss Bertha Henderson.
Review of Geography. Miss Bertha Henderson.

SYRACUSE UNIVERSITY, SYRACUSE, N. Y.

History and Geography of the South American Republics. Professor Patterson.

UNIVERSITY OF TEXAS, AUSTIN.

General Geology: An Introduction to Science. Includes considerable Geography. Professor Simonds. Adjunct Professor Whitney.

UNIVERSITY OF VIRGINIA, CHARLOTTESVILLE.

Physical Geography. Miss Kelley.
Industrial Geography. Miss Kelley.
Methods in Geography. Mr. Saunders.
Field and Laboratory Work. Miss Kelley.

UNIVERSITY OF WASHINGTON.

First Term:

College Physiography. Assistant Professor Saunders.
Economic Geography of Washington. Professor Landes.

Second Term:

Economic Geography of Washington. Assistant Professor Saunders.
Physiography of the U. S. Assistant Professor Saunders.

UNIVERSITY OF WISCONSIN, MADISON.

Elementary Geology and Physiography. Assistant Professor Steidtmann.
Commercial and Industrial Geography (not including the United States). Professor Whitbeck.
Geography of Asia. Mr. Blanchard.
Geography of Europe. Professor Whitbeck.
Geography of North America. Professor Whitbeck.
Resources and Industries of the United States. Mr. Blanchard.
Climate and Man. Mr. Miller.

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The JOURNAL *of* GEOGRAPHY

A Monthly Magazine Devoted to the Interests of Teachers of Geography in Elementary, Secondary, and Normal Schools.

RAY HUGHES WHITBECK, *Editor*
Of the Department of Geology and Geography at the University of Wisconsin

VOLUME XVI SEPTEMBER, 1917 NUMBER 1

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B. A. SINNEN, CIRCULATION MANAGER
APPLETON, WIS.

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